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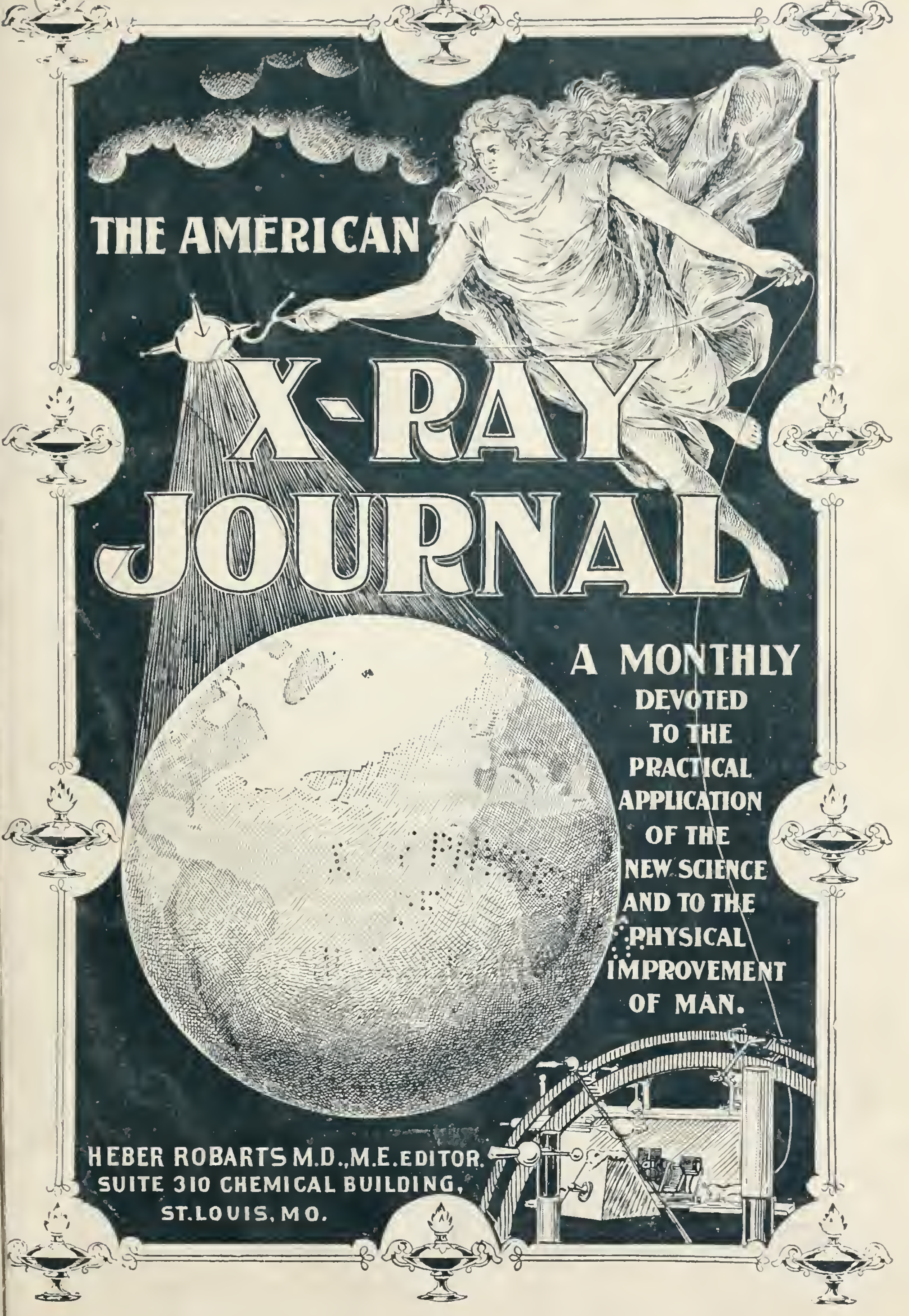
Vol. 7. No. 1. July, 1900.



THE AMERICAN X-RAY JOURNAL

A MONTHLY
DEVOTED
TO THE
PRACTICAL
APPLICATION
OF THE
NEW SCIENCE
AND TO THE
PHYSICAL
IMPROVEMENT
OF MAN.

HEBER ROBARTS M.D., M.E. EDITOR.
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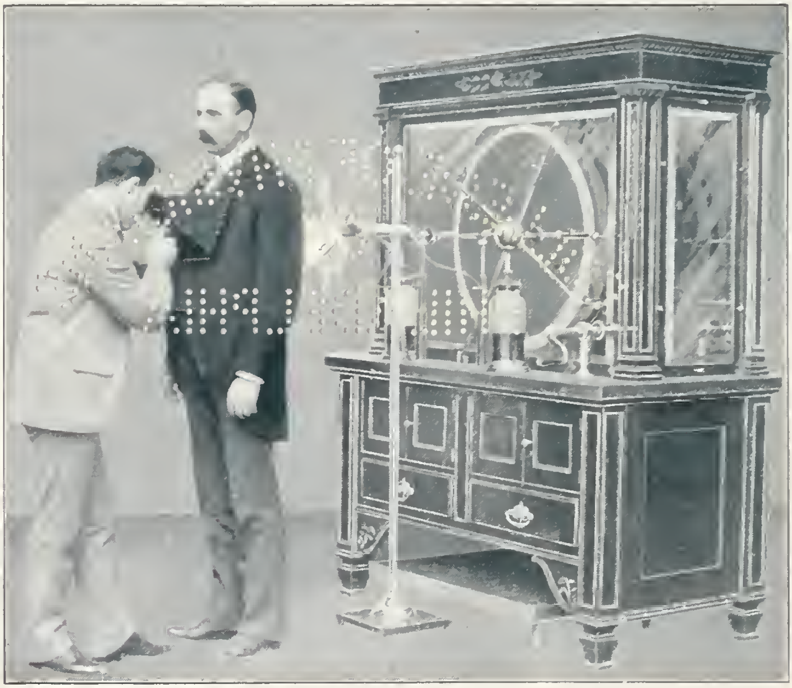

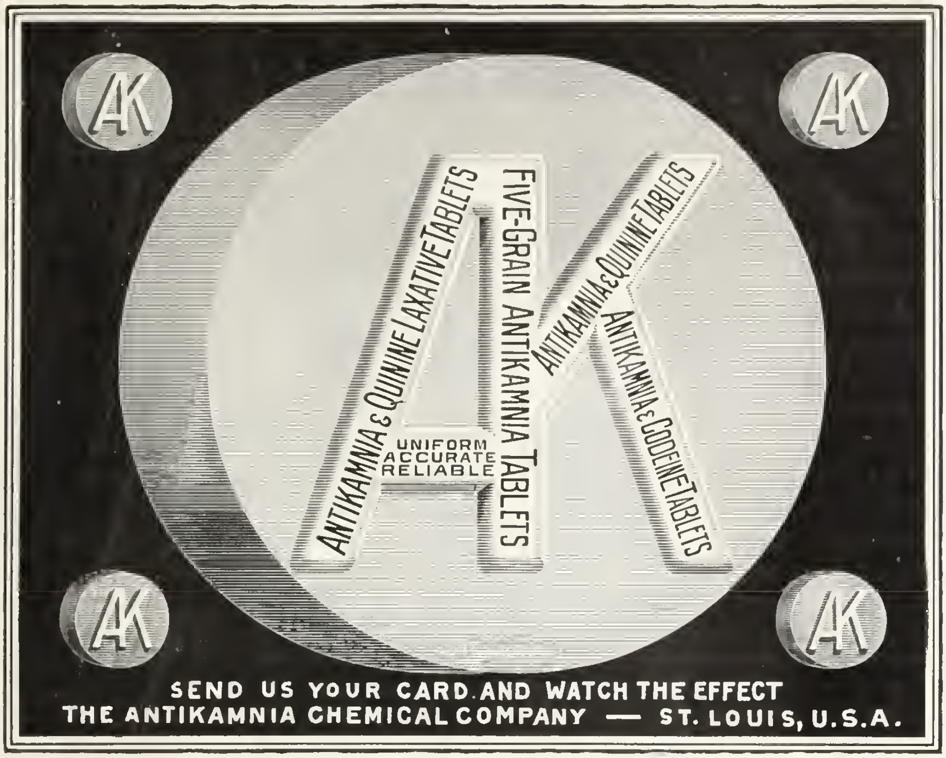
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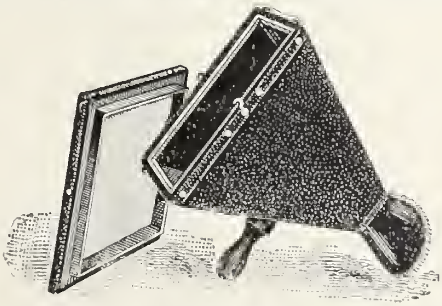

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From the writings of medical practitioners of wide experience in this special field, we have compiled a pamphlet which we designate the "Summer Pamphlet." In it will be found many highly valuable suggestions for the care of infants and children during the heated term, together with various formulæ suggesting treatment for infantile digestive disturbances, all of which tend to show that the base of many successful prescriptions for "summer complaint" is **LISTERINE.**

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THE AMERICAN
X-RAY JOURNAL.

Devoted to Practical X-Ray Work and Allied Arts and Sciences.

PUBLISHED MONTHLY BY THE AMERICAN X RAY PUBLISHING COMPANY.

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VOL. 7. *ST. LOUIS, JULY, 1900.* *NO. 1.*

CONTENTS VOL. 6 NO. 3.

Organization of the Roentgen Society of the United States.

Roentgen Society of the United States — Constitution.

Excitation of the Crookes' Tube by the Static Machine.

Editorials.

Exhibition of Skiagraphs, Report of cases.

Roentgen Society, London.

X-Ray Wins $15,000.

Improvised Static X-Ray Machine.

International Congress of Medical Electrology and Radiology.

Epithelioma.

Printing by Roentgen Rays.

Broken Neck.

Roentgen and Becquerrel Rays.

Another X-Ray Trick.

CONTENTS VOL. 7 NO. 1.

Roentgen Society of the United States by Dr. J. Rudis-Jicinsky.

Excitation of the Crooke's Tube by the Static Machine. Chapter V, by Dr. J. T. Pitkin.

Radiographs by Dr. Pitkin.

Excitation of the Crooke's Tube by the Static Machine. Chapter VI, by Dr. J. T. Pitkin.

Direct Method of Measuring X-Ray Intensities by Dr. F. S. Kolle.

X-Ray Reveals Open Safety Pin in the Rectum by Dr. M. K. Kassabian.

Congress of International Medical Electrology and Radiology.

Shall the Specialist Divide the Fee with the General Practitioner by Dr. Emory Lamphear.

Mechanical Action of Crooke's X-Ray Tube.

Roentgen Rays.

Cathode Radiation.

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DR. CARL BECK.

The American X-Ray Journal.

Devoted to Practical X-Ray Work and Allied Arts and Sciences.

VOL. 7. ST. LOUIS, JULY, 1900. NO. 1.

ROENTGEN SOCIETY OF THE UNITED STATES.

The preliminary announcement and invitation, to those wishing to become charter members has been sent to the profession not now members. The list is growing very satisfactorly, and will serve as an incentive, we hope, of prompting all the X-RAY workers to affiliate with us at an early date, before the committees will be named by the president.

The usefulness of the Roentgen Society of the United States depends much upon the number and character of the work done by its members at the annual meetings. No worker or man devoted to this new branch of surgery, medicine and science can afford to deprive himself of the advantages of this society, which object it is to find the best means of stimulating thought, encouraging research, prompting an increased diligence, and at the same time receiving the concentrated benefits of the best of the original work of scientific talent in the columns of its official organ THE AMERICAN X-RAY JOURNAL, the only one of it's kind in America.

This society is a national one and is already represented by members from every state. All those wishing to become members may do so by sending five dollars, with the necessary application directly to the secretary of the society. Remittances should be made by check, draft, registered letter, money or express order.

Roentgen Society of the United States will hold its first regular meeting at New York, N. Y., in December, 1900. Many able papers have been promised and a very successful scientific meeting is assured. Members desiring to read a paper should forward it's title to the Secretary at least two months before this meeting. Every paper received by this society and ordered to be published, and all plates or illustrations, shall be considered the exclusive property of the society, and will be published in the official organ of the same. There is no objection of reproduction of anything published in the journal, if proper credit is given. No paper shall be read by title, which is not actually in the hands of the officers of the society. The Committee on Publication will be expected to use their discretion in publishing only such reports and papers of the transactions as, after careful examination, it may conclude will be instructive and do credit to the society.

The transactions of the first meeting and organization of this society, with the Constitution, published in the March number of the JOURNAL will be sent on application. Write to Dr. Heber Robarts, President, 310 Chemical Building, St. Louis, Mo., or secure your receipt from the Secretary and he will take pleasure to place your name as a member on the list and in sending you the copy of the JOURNAL.

All other information will be cheerfully given. DR. J. RUDIS-JICINSKY,
Secretary.

Cedar Rapids, Ia.

Application Blank.

ROENTGEN SOCIETY OF THE UNITED STATES.

APPLICATION FOR MEMBERSHIP.

I hereby make application for membership in the Roentgen Society of the United States.

Signed ....
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$5.00 must accompany each application. There is no initiation fee. The official organ, "THE AMERICAN X-RAY JOURNAL," free. Send this slip with enclosure to Treasurer and Secretary:

DR. J. RUDIS-JICINSKY,
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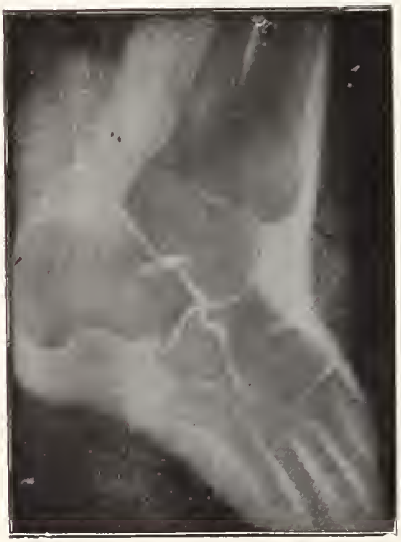


X-Ray Photograph—Bones of the Foot.

Tube excited by an eight, twenty-eight inch revolving plate static machine, employing one extra spark gap.

The Editor of the AMERICAN X-RAY JOURNAL will gladly answer any inquiry upon X-ray matter. Postage should accompany such inquiry.

EXCITATION OF THE CROOKE'S TUBE BY THE STATIC MACHINE.

Condenser Discharges.

BY JOHN T. PITKIN, M. D.

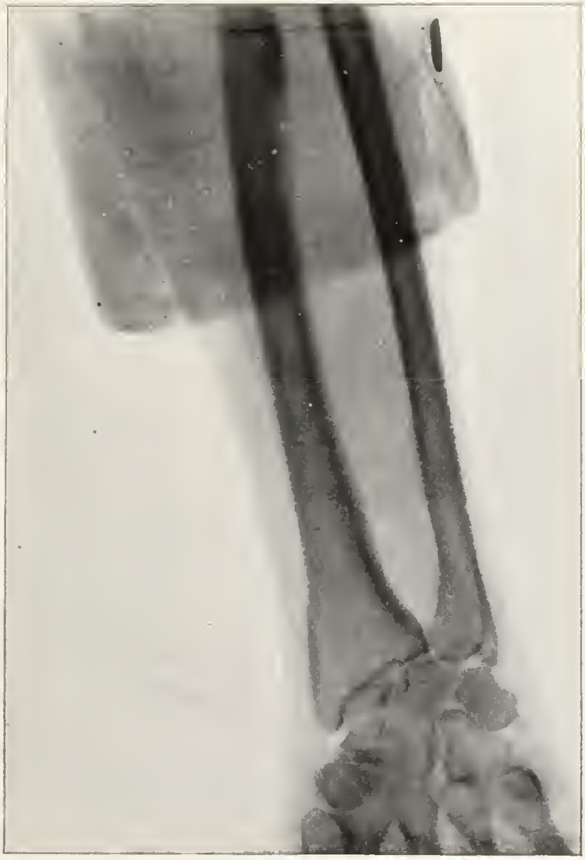
CHAPTER V.

By the capacity of a receptacle is implied its ability to receive, retain or contain a given maximum quantity of certain forms of matter or become the seat of a given amount of some particular force or forces, e, g. A certain individual posseses a stomach which can contain three pints of liquid nutriment, a bladder able to retain two pints of urine, a brain capable of becoming the seat of a given number of units of intellectual activity, but this does not necessarily imply the presence of any substance in the hollow viscera mentioned on the one hand, or a given amount of active cerebration on the other, simply the possibility of the utilization of these organs and their maximum limitations. This homely homologue is employed to preface the consideration of the capacity of electrical conductors and condensers, to elucidate the difference between the amount and pressure of the abstract electro-magnetic forces, and the ability possessed by metallic surfaces enveloped in a dielectric to retain, convey or modify the co-ordinating energy. The capacity of an electrical conductor may be defined as its power to receive, convey or retain a given amount, or milliamperage of electricity at a given potential, i, e, how much it is capable of holding upon its free or external surface, when surrounded by a given dielectric of a specified thickness, the relation of said surface to all other conductors, the electrical condition of the latter and the magnetic condition of the environment being duly considered.

The unit of electro-magnetic capacity is called the microfarad. The capacity of a Holtz static generator, is in direct proportion to the areal expansion of its integral metallic conductors, rods, combs, rod-holders and prime conductors including the bulbular enlargments in which the last mentioned objects terminate. When the machine contains but a small number of revolving plates the milliamperage is necessarialy very meagre, then large prime conductor balls may be employed as a compensating measure, their modus operandi and effects upon the current will be considered later. A more more efficient means of obtaining the critical capacity for a given instrument to be used for a specific purpose is found in the employment of one or more accessory condensers in the form of Leyden jars. As these jars are the type of all condensers, the structure and function of their various parts will receive passing mention. Wide mouthed bottles made of crystal or dielectrical glass devoid of all metallic ingredients are lined on their inside surface, from one third to one half the distance from the bottom upwards with tin foil. The outside is similarly covered. All portions of the bottles receive several coats of varnish to close the pores of the glass and thus overcome its bygroscopic properties. The covers of the jars are made of baked hardwood. Through the center of these covers passes a metallic rod terminating in a bulbous expansion above and a chain which is electrically connected to the inner coating of the jar below.

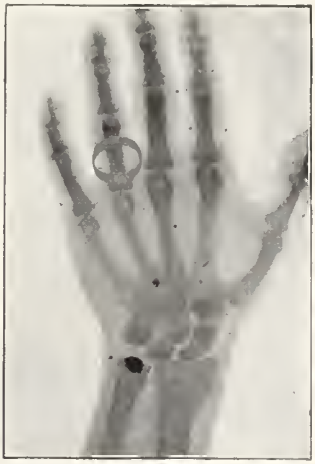
To charge the condenser the bulb of the jar is placed against one of the prime conductors of the generator, if the polarity of that side of the machine is positive, the inner coat of condenser is similarly electrified by conduction the outer coat negative by induction, and the intervening glass to become the seat of a magnetic field.

After the jar has been completely excited it cannot re-



Arthritis Deformans of Wrist-joint.

Skiagraph taken with tube excited by atatic generator which has ten revolving thirty inch plates. Two extra spark gaps were placed in the circuit.



X-Ray picture showing bones of hand bullet in wrist, buckshot in palm, and plain band ring on finger.

Tube excited by a twelve twenty-eight inch revolving plate static machine, employing Leyden jars as static transformers.

ceive any more electrical energy. To discharge the condenser the plates can be brought into metallic connection with each other or a spark gap may be formed by breaking the continuity of the discharger before it is applied to the coatings. In the latter case a convective spark discharge will pass across the interruption of continuity and a Crooke's tube placed in the spark gap will be momentarilly lighted

When a Holtz generator, in operation, has two Leyden jars placed in the circuit the coats of these condensers are unloaded through the discharging rods of the prime conductors. Such a static generator may be considered as a self exciting Leyden jar. All the metallic portions of one half of the apparatus represent the inner coating of a jar, opposite side the outer coating, the intervening air is the dielectric. This explains why in the starting of a static machine into action some time must elapse before a sufficient difference of potential is obtained to establish a convective discharge between the rods of the prime conductors. The longer the air gap the greater the potential difference required.

The larger the condensing surface placed in the circuit the longer will be the time required to establish the critical difference and the less frequent the discharges for a given air-gap, and the greater will be the milliamperage of the current. The longer the air-gap or total gaps the higher voltage required in order to overcome the same, and the smaller the condensing surface that will be necessary to obtain a given quantity of electricity. Each Crooke's tube will operate best when supplied with a current of a certain specific quantity, driven by a critical voltage or pressure, i, e, the voltage must be sufficient to overcome the air-gap in the tube plus any other gaps which have been superaded An excessive voltage is not only an idle waste of energy which can be seen escaping from the conducting cords and various portions of the apparatus, but it also vitiates the x-ray effects, strains the tube, and may cause electro-chemical burns, to tissues accidently placed within its pathway. When the quantity of electricity supplied by the machine is below this critical milliamperage, Leyden jars q, s, should be placed in the circuit. Spark gaps can be increased in length or number and the machine run at greater speed.

To tersely recapitulate. The voltage of a static machine is a function of, 1. The size of the plates, 2. Time or speed at which they are driven, 3. The length of the spark-gap, 4. The condensing surfaces placed in the circuit. The milliamperage is a function of, 1. The number of plates, 2. Capacity of the conductors, 3. Speed, 4. Length of spark-gap, 5. The magnetic discharges.

X-radiance is a function of a critical current driven through a specific x ray lamp at a critical voltage. Any fairly good static machine irrespective of size or construction can be made to perform the most difficult x-ray work when its operator has thoroughly mastered the corelation of the forces of electricity, magnetism and x-radiance and their relation to matter through which they become manifest.

BUFFALO, N. Y.

The Roentgen Society of the United States will meet in New York City in December of this year. The exact date and place of meeting will be announced in the next issue of the official organ—the AMERICAN X-RAY JOURNAL. Papers have been promised from a number of widely known physicians, surgeons and physicists. Manufacturers of x-ray apparatus and accessories together with electro-therapeutic machines will provide for ample exhibition room. The largest and most complete display ever made will be at this meeting.

The demand for x-ray apparatus is increasing. Physicians in towns are preparing to do the work done in large cities.

EXCITATION OF THE CROOKE'S TUBE BY THE STATIC MACHINE.

Conduction.

BY JOHN T. PITKIN, M. D.

CHAPTER VI.

The force which we call electricity may be said to exist in two conditions. (1), Potential, neutral, passive or latent. (2). Kinetic or active. In the latter state it is divided into two equal but dissimilar quantities, i. e., positive and negative and a secondary variety of energy called magnetism becomes manifest. Magnetism is always kinetic, never at rest, but incessantly struggling to close up its lines of force and bring about the restoration of an electrical equilibrium. During the process of restoration the magnetic energy may be utilized in the prosecution of manifold mechanical procedures. The function of a static machine, a dynamo or a battery, is to separate the two varieties of electricity from each other and the generation of magnetism. In our effort to draw a mental picture of the process called conduction let us endeavor to embody the ideas of all the more modern electrical experts, assuming in the absence of contradictory proof, that their opinions partly founded upon the results of elaborate experimentation and partly hypothetical represent the best obtainable working formula of the modus operandi. They teach us that the process varies with the composition and density of the medium through which the electricity is exhibited. Thus in the air or other gases, two opposite directed streams of molecules, each individual carrying an electrical charge, play between the metallic electrodes. Owing to the resistance of gaseous mediums a relatively high E. M. F. is required for its maintainance. If the intervals between the electrodes are increased in length or number their potential difference must be proportionately intensified. (See chapter entitled Convective Discharges, February issue.), American X-Ray Journal. The propagation of the electrical energy through liquids is accomplished by an alternating of anylitical decomposition of the compound into its constituent atoms and their synthetical recombination, each time the atoms changing partners in such a manner as to keep the positive atoms, electrically charged, moving towards the negative electrode and the positive atoms in the opposite direction. (See R. A. Witthous' works on chemistry.) Conduction by solid media. When the two ends of a metallic wire attached to the two sides of a static machine, a dynamo, or a battery, in operation become simultaneously electrically excited the one positive the other negative then the outer layer of molecules entering into their composition take on a specific rate of vibration (motion being an inherent property of matter.) Page 2. The electrical character of the the particles causes them to become polarized so that their axes correspond with the length of the wire, the positive ends all facing in the direction of propagation of the positive waves and their negative sides facing with the negative waves. The molecules of the surrounding medium, the dielectric are also polarized but at right angles to the components of the electric. From the positve conductor the positive ends project outwards, conversely from the negative wire the negative sides face exteriorly. This condition of the surrounding medium constitutes the magnetic field of force. The magnetic field is frequently intensified by winding the conductor into a coil, then its power in a given space will obviously be proportionately augmented. The excited dielectric consists of a polarized surging medium, expanding under restraint or tension like a bow which is bent or a spring which is wound with a tendency to recoil or be released (Magnetic Discharges) through the instrumentality of conducting objects, and, directly or indirectly establish an electrical equilibrium. Your humble scribe ventures the suggestion that the magnetic influence of the earth may be a factor tending to bring about the molecular re-action. Isolated conductors, irrespective of shape placed within a magnetic field are electrified in the same manner as if they comprised but a single molecule of matter. A change in their position necessitates a re-adjustment of the charge and causes an electrical flow. Thus if a secondary closed coil of wire is moved through a magnetic field, it will become a conductor of an induced current. When the electrical action of a primary circuit is intermittent, e, g, if extra spark gaps are employed for x-ray work, although a secondary conductor remains stationary the latter will be electrified with an intermittent current of the opposite polarity. Hence two or more metallic objects, gas, water or steam pipes, etc., etc., of an apartment may be inductively charged, and form a remote secondary circuit thus wasting the energy of the static generator. One or more conductors electrified by induction may communicate with dissimilar poles of a poorly insulated machine with the same result. These facts have given rise to the fallacious ground wire dogmatism.

So extended is the influence of the magnetic field of high tension electrical apparatus (the magneto motive force of the field corresponding in intensity with the electro motive force of the current with which it co-ordinates) that its waves of force can be intercepted at a considerable distance from the generator to produce induced currents in a Hertz coherer aud a Ruhmkorff coil thereby establish communication called wireless telegraphy.

It follows that the wall, ceiling and floor of an apartment are unavoidably effected by induction, that they should as far as possible be made of non-conductors, and the wood-work oiled or varnished. Great care must be taken that the machine, Crooke's tube and the patient are perfectly insulated otherwise the stray conducting and the inducting actions may intermingle and reduce the efficiency of the generator. With the moderate E. M. F. actually required for the best x-ray work the metallic objects of the apparatus, rods combs and wires constitute the only conducting paths and from these there will be no wind, spray or glow discharges, but if the voltage is unnecessarily high the woodwork, unvarnished glass and humid atmosphere become fair conductors, each dissipating a portion of the electrical current, under these conditions feelings of slight drafts, sprays or like cob-webs upon the hands and faces of the bystanders may be experienced, and the wires of communication between the Crooke's tube and the machine will emit a purple glow, all of which represents wasted electrical energy.

BUFFALO, N Y.

Roentgen Society of the United States.

OFFICE OF THE SECRETARY, CEDAR RAPIDS, IOWA.

JUNE, 1900.

This certifies that W. A. Price, D. D S. from Cleveland, Ohio, United States, America, has been regularly admitted as a member of the Roentgen Society of the United States and that in accordance with, and under the provisions of the Constitution of the Society, he is appointed as a delegate, to represent that society and to participate in the International Congress of Medical Electrology and Radiology, in Paris, France, from the 27th of July to the 1st of August, 1900.

In witness whereof, the Roentgen Society of the United States, has caused this to be signed by its President and Secretary this 20th day of April, one thousand nine hundred.

J. RUDIS-JICINSKY, Secretary.
HEBER ROBARTS. President.

Physicians who desire to be posted in what is being done in x-ray work should read the American X-Ray Journal. Subscribe now.

DIRECT METHOD OF MEASURING X-RAY INTENSITIES.

BY DR. FREDERICK STRANGE KOLLE.

The present fluoroscopic, photographic and ionization methods of measuring the intensities of Roentgen rays are, more or less, subject to such inaccuracies as to make them very unsatisfactory.

The faults are due primarily to variations in the generating apparatus and secondly, to the difference of ray intensities given off by a tube used as a standard, while in the photographic process the several chemical processes produce results, however slight, that occasion often visible variations.

To Mr. Perreau* we owe the discovery that selenium is acted upon by the rays in somewhat similar manner as ordinary light, except that the action is not as active, or powerful, if you please.

Knowing that electric waves have no influence on selenium, it becomes at once an agent applicable to the direct method of measuring the intensities of x-light. Again the simplicity of the apparatus recommends it to the general physicist.

The apparatus to be employed is made up as follows:

A disc or strip of selenium, such as is furnished by manufacturers for experimental purposes is inclosed in a hard rubber case having a thin aluminum shutter on the side to be brought in close proximity to the active tube. A hard rubber rod, six inches in length, supports the case from the base plate of wood.

Two copper strips or wires are connected to the selenium at the top and bottom and attached to binding posts placed under the cases, to which one of the wires from the battery and the galvanometer are connected.

A battery of 10 chloride of silver cells is introduced between one binding post and the galvanometer.

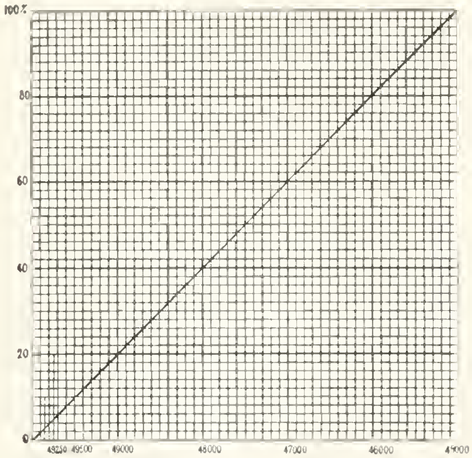
The galvanometer should be of the mirror type.

A contact keg is placed in circuit to facilitate the weakening and breaking of the current.

To increase the x-light intensity the resistance of the selenium is first noted.

The apparatus is then brought near the tube with the aluminum shutter facing the latter at a distance of two inches.

The tube is put into action and the resistance of the selenium cell is again measured after the oscillation of the reflected light ray has assumed a minimum. A decided difference in the resistance of the selenium is noted, varying, if in the first measurement it corresponded to 50,000 ohms, as much as 6,000 or 7,000 ohms.



In calculating the resistance of disc let

R = resistance of selenium disc (normal)

R_x = resistance of selenium disc (x-ray)

D = deflection corresponding to R

D_x = deflection corresponding to R_x

then the galvanometer deflection varies inversely as the resistance, or,

$$D_x : D :: R : R_x$$

from which

$$R_x = R\frac{D}{D_x}$$

If, for the matter of standardization the maximum resistance reduction with an x-ray tube is assumed as 5000 ohms where a disc of 50,000 ohms normal resistance has been employed, then the former represents 100 per cent and the latter 0, (zero) x-ray intensity.

---

*Perreau. Comp. Rend. 129 pp. 956–57.

A table, as follows, may be prepared by which the efficiency of a tube can easily be computed:

X-RAY INTENSITY. Per Cent.	Rx
0	50,000
10	49,500
20	49,000
30	48,500
40	48,000
50	47,500
60	47,000
70	46,500
80	46,000
90	45,500
100	45,000

In like manner a chart (as shown in Fig. 2) with the values given and intermediate values could be prepared from which the tube efficiency can be read off directly.

BROOKLYN, N. Y.

Accessories to the x-ray machine are increasing daily. Methods for the treatment of lupus, psoriasis, eczema and for epilation purposes require modes of application characteristic of the ailment. It is not sufficient to have a generating apparatus. Besides knowing the nature of the tube, the measure of intensity must be known. To gauge intensity, instruments are required. It is also necessary to have appliances that will limit the field of exposure by the will of the operator. Display of these new inventions so practical for the physician using x-rays, will be on exhibition at the December meeting of the Roentgen Society of the United States.

Roentgen Tube.—KURLBAUM.—A description of a new Roentgen tube with a Pabst anticathode. In order to keep the anticathode at a low temperature, it is covered electrolytically with platinum black, as this has a very great power of emission for heat rays, while that of platinum is very small.—*Elek. Ziet.*, March 22.

X-RAY REVEALS OPEN SAFETY PIN IN THE RECTUM.

May 5, 1900.

EDITOR AMERICAN X-RAY JOURNAL:

DEAR SIR:—The following case came before me recently and as I thought it would be interesting to the readers of your valuable journal, I quote you the circumstances which are as follows:—

A baby girl, fourteen months of age, from a suburban town swallowed an open safety-pin on Monday April 23rd, and caused her parents untold anxiety, lest it should bring about her death.

A physician was called at once and made an examination of the throat but could not locate the pin and ordered the parents to feed the child on rice and other starchy foods, hoping that these would carry the cause of all the trouble away when the food passed from the child. However, this treatment failed to have the desired effect, and on April 26th, the attending physician advised the parents to take their child to Dr. Earnest Laplace, Professor of Surgery of Medico-Chirurgical College and Hospital, for him to locate the pin and operate for its removal.

Prof. Laplace submitted the patient to x-ray examination. A fluoroscopic examination revealed nothing.

The child was placed on a 14x17 inch plate, back downwards and, as she was constantly screaming and twisting it was necessary to hold her extremities firmly, to get any results at all. In spite of all efforts to hold her quiet, crying caused her abdomen to rise and fall incessantly, necessitating the use of a high vacuum and short exposure, about half a minute.

Upon developing the plate it was found to be very weak and the abdomen looked like an unexposed blank plate. By the use of a ground glass, at a certain degree of inclination, the lung was visible, and a suspicious shadow in the region of the sigmoid flexure, slightly resembled the ends of a safety-pin, but being very faint, little dependance could be placed upon it. It was decided to make another attempt.

This time we placed two safety-pins on top of the abdomen, one vertical and the other horizontal, fastening them with adhesive plaster. This was done in order that the shadow of the offending pin could be positively identified.

An exposure similar to the previous one was made and, on developing the plate, the negative revealed the safety-pin in the upper portion of the rectum, very much more distinct than the pins we placed on the abdomen. This fact is accounted for by the circumstances of the latter being further from the plate than the former, and the abdomen being in a constant state of motion. The straining of the child in her efforts to extricate herself, had pressed the pin downward so far that it showed in the upper portion of the rectum with the end pointing upward.

About the time we had finished the plate the pin was passed with a hard mass of feces, in which nature had incased it, in order to prevent the points from piercing the intestine.

This case should indicate that we should not be alarmed by children swallowing small foreign bodies like tacks, pennies, etc., as nature provides her own process of disposing of these things.

A lesson is also taught, that if an operation is found necessary, it should be performed immediately after the foreign body is located, because the peristaltic motion of the intestine, these bodies have a tendency to move downwards.

The above case brings to mind a demonstration given by the celebrated "Ostrich Man," a professional glass eater, given before the students of the Medico Chirurgical College a few weeks ago. Immediately after the exhibition, an x-rays photograph of his stomach was taken, which revealed the matter he had eaten, consisting of forty tacks, six horse shoe nails, five large screws and many pieces of broken glass.

This instance would indicate that th mucous membrane of the intestine is not easily endangered by foreign bodies.

Yours respectfully,

M. K. KASSABIAN.

Skiagrapher to the Medico-Chirurgical College and Hospital, Philadelphia, Pa., U. S. A.

Skiagrapher to the Medico-Chirurgical College and Hospital, Philadelphia, Pa.

Congres International d'Electrologie et de Radiologie Medicale.

At the request of the French Society of Electrotherapy and Radiology, the International Congress of Electrotherapy and Radiology, is attached to the International Congress of 1900.

The committee which is charged with the organization of the Congress embraces the names of M. Weiss of the French Faculty of Medicine, as president; Messrs. Apostoli & Oudin, vice-presidents; M. Domer, of the French Faculty of Medicine, secretary-general; M. Montier, secretary; Boisseau du Rocher, treasurer; and also M. M. Bergonie, Bonchacourt, Branly, Broca, Larat, Radignet and Villemni.

This Congress will take place at Paris, from the 27th of July to the 1st of August, 1900. For further particulars, address, M. C. professeur E. Donmer, 57 Rue Nicolas-Leblanc, Lille, France.

Every physician setting fractures should use the x rays with the intention of proving the picture at the start. The proof of the picture can only be made with impervious right angle devices capable of casting a shadow. Such radiographs are accepted in all competent courts.

At the meeting of the Roentgen Society in New York City, in December, there will be offered advantages to the visiting members for instruction in x-ray work that cannot be had under any other condition.

Shall the Specialist Divide the Fee with the General Practitioner?*

BY EMORY LANPHEAR, M. D., PH. P., ST. LOUIS, MO

Formerly Professor of Surgery, in the Kansas City Medical College and the St. Louis College of Physsicians and Surgeons; Gynecologist to St. Joseph's Sanatarium.

When an attorney in a county-seat has a client in danger of the penitentiary and hence in need of the very best of council, it is customary for him to seek some eminent lawyer of a great city and request his aid. In so doing, does he approach the distinguished gentleman and say: "I have a client accused of ———, who is able to pay $3,000 for his acquittal; will you take the case with me for this sum —— leaving me the gratification of having done my professional duty?" By no means! He plainly states: "My patron has $3,000 for his defense; are you willing to take $2,000 of this to join me in securing justice for him?"

Arrangements of this kind are made daily in every large city. Does anyone ever suggest that the country attorney has been doing a dishonorable act in thus securing his brother practitioner to do the major part of the work for the $2,000, he retaining $1,000, for his services? Would a doctor, sued for $100,000, regard such a transaction as disgraceful, unethical, objectionable, if thereby he were saved this sum?

But let the question be one of saving life instead of securing liberty, or preventing financial loss—and how different it is!

If a country doctor have a patient with recurrent appendicitis (upon whom he might operate with success, but fears possible failure) with a prospective fee of $600, must he—in order to be "ethical"—write to some city surgeon to come to his help, take all of the $600 and leave him merely the satisfaction of a duty well performed, or possibly pay for a few visits at starvation rates? "Upon what meat doth this our Ceasar feed that he hath grown so great?"

Why should not the country doctor plainly say to the city specialist: "I have a patient with appendicitis who is able to pay $600. Will you operate for $400 and leave me $200 for preparation, after-treatment, etc?" What would be wrong about this? Let Drs. Robt. T. Morris, of New York, and Burnside Foster, of St. Paul, who so vigorously maintain that division of the fee is unethical under any and all circumstances, point out what injustice would thereby be done to (a) the patient, (b) the attending physician and (c) the eminent surgeon. Why should we not learn a few things from the methods of our most noted lawyers, men who are above suspicion as to unethical conduct? Have we not hitherto been too unmindful of the financial interests of ourselves and our professional brothers?

I maintain that the payment of a "commission" for all business simply "referred" to a specialist, or for mere consultations, is probably unethical—certainly demoralizing in tendency; but that division of the fee is perfectly honorable and right when the specialist and the general practitioner jointly share the work and the responsibility.

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*Extract from paper read before the Missouri State Medical Society, May 1900.

Mechanical Actions of Crooke's X-Ray Tube. –MICHKINE.-A Russian Physical-Chemical Soc. paper. A light magnetic needle placed in the field of a Crooke's tube will take a position parallel to a line joining the electrodes; the same is true of a needle of non-magnetic material or a dielectric. One of larger dimensions will start to turn if it is given a slight impulse; it will turn in either direction but with different velocities. A thin celluloid disc on a pivot affords a simple and convenient means for exploring the field of a Crooke's tube. Some conclusions thus arrived at concerning the field are given.—*Jour. de la Soc. Physico-Chimique Russe*, Vol. 31; abstracted in *L'Eclairage Elec.*, Feb. 3.

Relief for British-Boer War Sufferers.

The following letter from the London office of The Antikamnia Chemical Company, under date of March 2nd, 1900, will be found interesting.

DEAR SIRS:—It was suggested to me a few days ago that I should contribute some Antikamnia to one of the Hospital Ships going out in charge of Dr. Conan Doyle and Surgeon O'Callaghan, F.R.C.S., the latter of whom is well known to me, and has a very substantial practice. I have contributed to this Hospital Ship and to 'Maine,' equally, in your name, the following exact number of ounces, viz: 12 dozen ounce of Antikamnia Powdered and 24 dozen ounces Five-Grain Antikamnia Tablets, in all 36 dozen ounces, and I feel certain that you will readily endorse what I have done. This constitutes the first introduction of Antikamnia, in quantity, to the Army Medical Service of Her Majesty.

February sales show nearly double the volume of sales for February, 1899. Rather a pleasant report to make, is it not? Regular monthly statement by next post.

Yours very truly,
THE ANTIKAMNIA CHEMICAL COMPANY,
Per J. M. Richards.

REPLY.

ST. LOUIS, MO., U. S. A.,
March 14th, 1900.

DEAR SIR:—In reply to your favor of March 2nd, 1900, we beg to say that the contribution of 36 dozen ounces of Antikamnia Preparations to Hospital Ships, may most agreeably be charged to account of Home Office.

We must thank you for your timely thoughtfulness in making these donations. We have, on this side also, contributed liberally to the Boer Relief Fund, through the local representative, Dr. Emil Preetorius, of this city.

Glad to note your reference to increased sales, etc.

Sincerely yours,
THE ANTIKAMNIA CHEMICAL COMPANY.
Frank A. Ruf, Pres't.

The pure ozone, the life-giving properties of the river air of the Upper Mississippi River builds up the system in a surprisingly short time and is hailed alike by the invalid and the pleasure seeker.

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The passenger route from St. Louis to St. Paul on the Diamond Jo Line Steamers, affords one of the most enjoyable and health giving trips in America. Persons seeking rest and cooler air in northern points will find this the most happy and restful of their entire summers' outing.

The beauty of the Upper Mississippi is historic, as is heard in the legends of the aborigines, and since appreciated by the white man and sang in modern verse.

Passengers have freedom to the steamers decks, drawing rooms and prominades which removes all restraint from crampt travel. Nothing has been spared to contribute to the comforts of passengers. The genial captain, attentive purser and kind matron combine to meet every want. The cuisine is inviting and the state rooms are models of cleanliness. Good bye mosquitoes and flies! They are not in this route. More comfort in travel than at home, has been the study of American art, but no where out of the Upper Mississippi has man and nature combined in greater pleasantries.

Roentgen Rays.—ROLLINS.—An illustrated continuation of his long serial, giving notes on the occlusion and chemical combination of hydrogen in the glass of the tubes; also on heating Roentgen tubes having high resistance. The resistance of a tube is not an indication of the degree of the vacuum. Tube makers should not take a tube from the pump unless it glows with a brilliant, white light, after the current has been cut off; this phosphorescence is always present in a fine tube. Then follow notes on the "radiant area plume," on the fan of the Varley stream, and on "non-radiable cases for x light tubes"—*Elec. Rev.*, Apr. 11.

Roentgen Rays.—Rollins.—A continuation of his illustrated serial. When a tube has become useless, he recommends filling it

GREAT MINDS CHANGE.

Emmet Densmore, M. D., 1891.

"Woolen garments in underclothing and bed-clothing are greatly superior to those made of vegetable fiber, be they cotton or linen."—From How "Nature Cures."

It takes a strong mind to have convictions, but a still stronger one to change them if found erroneous.

Emmet Densmore, M. D., 1899:

"LINEN IS THE BEST MATERIAL FOR UNDERWEAR,:

It absorbs moisture more readily than wool, and also gives it off more readily, and the body is thus encased in dry instead of damp garments. Cotton is a compromise between wool and linen.—From "Consumption and Chronic Diseases."

The above change was brought about by an investigation of the claims made in behalf of **DR. DEIMEL'S LINEN-MESH UNDERWEAR**, which is truly the most healthful and comfortable fabric known to science.

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with illuminating gas until the hydrogen has combined with the terminals, and then to repump. He tries to explain the appearances of perforated termils in vacuum tubes. He made cathodes of most of the common metals and found hydrogen in most of them; in zinc it is so abundant that this metal makes a good cathode, so far as the production of Roentgen rays is concerned. He adds some remarks concerning the reduction of the cost of Roentgen tubes. He discusses mercury cathodes; and the free electron and other ether theories of cathode rays.—*Elec. Rev.*, Jan. 10 and 17.

Cathode Radiation.—Wiechert. Electrical World & Engineers.—An illustrated account of an experimental investigation by which he found the ratio of the charge and the mass of a cathode particle to be 12,600,000 c. g. s. units (Simon's value is 18,650,000; Digest, Dec. 23). He uses this result to determine what amount of matter is transported with each electron, or the "mass of an electron," and finds it to be the "1 or 1-1300th part of the atomic weight of oxygen." He indorses the corpuscular theory of electric conduction, believing that electricity is a form of matter which links the atom to the surrounding ether, but can be transferred from one atom to another. He favors the idea that there is only one type of electron, and that it is the negative one; this would seem to be a modern variation of the old one-fluid theory.—*Wied. Ann.*, No. 12; abstracted in London *Elec.*, Jan. 12.

During the past year there has been a decided improvement in electro-therapeutic apparatus and x-ray machines. Especially has this advance been made with the coil for x-ray purposes. Their have been more than a dozen designs brought out for amplifying the x-ray output, everyone of which is an advance over the method of one year ago. The writer has a radiograph showing abscess of the brain in an adult taken with two seconds exposure. Subsequent surgery, which proved successful to the patient, verified even the outlines of the x-ray findings. The working of such an apparatus will be instructive at the Roentgen Society of the United States in December.

THE AMERICAN X-RAY JOURNAL.

Devoted to Practical X-Ray Work and Allied Arts and Sciences.

PUBLISHED MONTHLY BY THE AMERICAN X RAY PUBLISHING COMPANY.

HEBER ROBARTS, M. D., M. E., Editor.

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VOL. 7. *ST. LOUIS, AUGUST, 1900.* *NO. 2.*

CONTENTS VOL. 7 NO. 1.

Roentgen Society of the United States by Dr. J. Rudis Jicinsky.

Excitation of the Crooke's Tube by the Static Machine. Chapter V, by Dr. J. T. Pitkin.

Radiographs by Dr. Pitkin.

Excitation of the Crooke's Tube by the Static Machine. Chapter VI, by Dr. J. T. Pitkin.

Direct Method of Measuring X-Ray Intensities by Dr. F. S. Kolle.

X-Ray Reveals Open Safety Pin in the Rectum by Dr. M. K. Kassabian.

Congress of International Medical Electrology and Radiology.

Shall the Specialist Divide the Fee with the General Practitioner by Dr. Emory Lamphear.

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Roentgen Rays.

Cathode Radiation.

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X-Ray Burns. By J. N. Scott, M. D.

Pro Et Contra. By J. Rudis-Jicinsky, A. M. M. D.

Static Machine. By Y. M. G. Beard.

Answers to Inquiries.

Roentgen Rays for Examining Coal.

"Archives of the Roentgen Rays."

Generalized Cathode Rays.

Becquerel Rays.

The Roentgen Society, London.

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VOL. 7. *ST. LOUIS, AUGUST, 1900.* *NO. 2.*

ROENTGEN SOCIETY OF THE UNITED STATES.

The Roentgen Society of the United States will meet in New York City, December 13th and 14th, 1900, at the Academy of Medicine. Papers have been promised by eminent men abroad and at home, and a very successful scientific meeting is assured.

The officers of our society are desirous of building up an organization which will have for its object the advancement of pure x-ray science and art. It is expected that we will be in position to glean from all sections of the world, useful facts for the purpose of publication and teaching. The burden of spreading the knowledge of the technique of electrology and radiology amongst our members is devolved upon us, and with the promotion of harmony and fraternity in the professions using the x-rays, our sphere of knowledge will be widened.

We kindly and earnestly ask that every x-ray worker will give a little of his valuable time and influence in accomplishing the object in view, that it may be the means of enlisting many who heretofore have not taken any interest in this line of work, in the new means of early and proper diagnosis and the therapeutic value of the x-ray. Let us strive to interest physicians, surgeons and dentists, in the use of the x-rays, and as medical men, to help to promote all measures adapted to the relief of suffering, and to improve the health and protect the lives of the community. We have to try, therefore, to bring the x-rays more and more to the attention of the profession. We feel that very much can be done, and at our New York meeting it will be proven that every physician, surgeon, dentist, etc., ought to learn to make x-ray examinations himself. There will be offered advantages to the visiting members at this meeting, for instruction in x-ray work that cannot be had under any other conditions.

It is especially desired that all hospitals using x-ray apparatus, x-ray studios and laboratories, physicians, surgeons and dentists doing x-ray work, scientific investigators, manufacturers and dealers in x ray apparatus of all kinds throughout the United States, should at once send their names and addresses to the Chairman of Committee of Arrangements, Dr. S. H. Monell, 43 East 42nd street, New York city, so that they may receive important notices regarding our meeting.

All those wishing to become members, or read a paper before the society, may communicate with the secretary. ***No quacks or fakes of whatever sort need apply.*** The Committee of Arrangements will verify the credentials of delegates and members, receive and examine all applications and letters of introduction presented by those wishing to become members by invitation; recommend the number and length of sessions, demonstrations, experimentations, etc., to be held daily, receive and announce all voluntary communications, and take general supervision of all the preliminary work and of the arrangement of business coming before the meeting, reporting time to time as it may be necessary.

To make our regular gathering pleasant and profitable, the president, Heber Robarts, St. Louis, Mo., appointed the following committees, whose duty it shall be to communicate with the Chairman of the Committee of Arrangements and report to the society at our meeting in New York.

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Cedar Rapids, Ia., August 1900.

Application Blank.

ROENTGEN SOCIETY OF THE UNITED STATES.
APPLICATION FOR MEMBERSHIP.

I hereby make application for membership in the Roentgen Society of the United States.

Signed ....
Full name.

P. O. Address...... . ...

$5.00 must accompany each application. There is no initiation fee. The official organ, "THE AMERICAN X-RAY JOURNAL," free. Send this slip with enclosure to Treasurer and Secretary:

DR. J. RUDIS-JICINSKY.
CEDAR RAPIDS IOWA.

"The Photogram" is a regular visitor. It reaches us monthly and is the most picturesque and artistic publication that we receive. It is replete with illustrations, every one of which hinges upon a story pertaining to photographic art and science. We have seen in this journal some of the richest colored photography yet made. Sometimes something good is said about the x-rays, but we have looked, with disappointment, for more on the development of the x-ray plates. The JOURNAL should go into the hands of every person interested in art, and especially that phase which embraces kodak and photographic work. "The Photogram" for July is a special landscape issue.

The Editor of the AMERICAN X-RAY JOURNAL will gladly answer any inquiry upon X-ray matter. Postage should accompany such inquiry.

EXCITATION OF THE CROOKE'S TUBE BY THE STATIC MACHINE.

Disruptive Discharges.

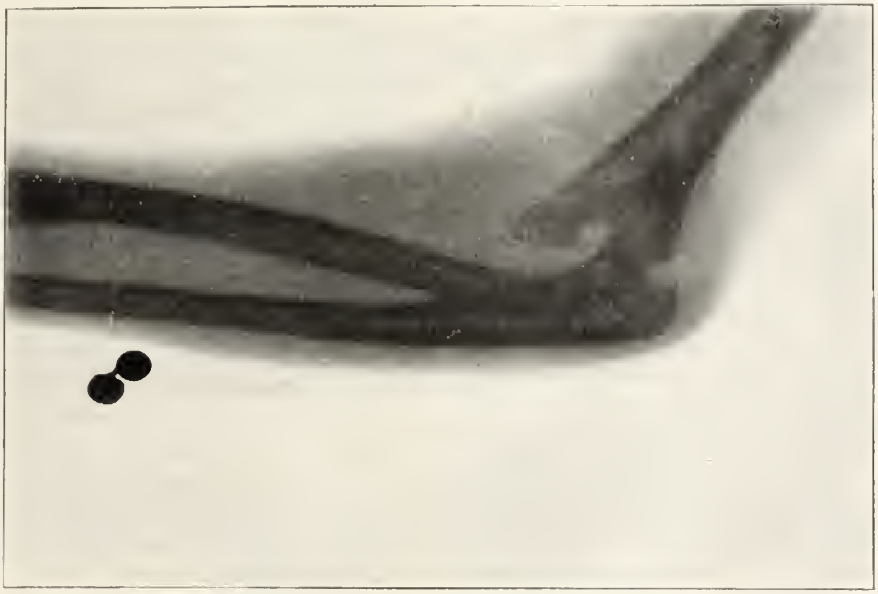
By John T. Pitkin, M. D.

Chapter VII.

During atmospheric disturbances two clouds, or a cloud and the earth frequently become charged with opposite varieties of electricity, the intervening atmosphere is strained by a magnetic field of force until its limit of strength is reached; the dielectric breaks at the weakest point, a crash and a lightning flash are the manifestations of the unloading of one of Jehovah's Leyden jars, the disruptive discharge of the static machine of the Omnipotent.

In a similar manner, when a Leyden jar of a Holtz generator is excessively charged, the dielectric glass, which is the seat of the magnetic field, is strained; under the extreme molecular tension the structure gives way, the glass is ruptured and the condenser ruined. The thicker the glass the less danger of breaking, but the magnetic permeability is proportionately lessened. As annealed glass possesses superior dielectric strength and is less liable to breakage from various causes, the Leyden jars, stationary and revolving plates, should be made of that material. When a Crooke's tube is operated in simple series, the dielectric air within the static generator, is strained in direct proportion to the voltage used. Should the atmosphere suddenly give way, a spark will leap across between the comb-holders of opposite sides, and the tube will be severely strained or punctured. The liability to internal disruptive discharges is greater when the current is made interruptive by spark gaps, than when it is continuous, becaue the dielectric can better bear a steady than an intermittent strain.

In a darkened apartment the modern static apparatus affords certain luminous characteristics from which the skilled operator obtains the following valuable information: (1.) The polarity, i. e., which side is positive and which negative. (2.) The volume of current being supplied to the tube. (3.) Whether there are inactive or unexcited portions. (4.) The presence



SUBLUXATION OF ELBOW JOINT, SKIOGRAPH TAKEN WITH TEN, THIRTY INCH, REVOLVING PLATES, TWO SPARK GAPS IN THE CIRCUIT.

or absence of extrinsic or wasteful internal discharges. (5.) The maximum voltage or difference of potential at which the machine can be operated.

From the teeth of the combs of the negative side of the generator may be seen a characteristic purple brush discharge, from three to five inches long, which seems to be leaping upwards to meet the approaching portions of the revolving disks, it appears as if each tooth gave vent to a burning jet of gas, blazing against their surface. On the positive side the illumination is extremely meagre, each tooth being tipped with a miniature glow, as if mounted with a little sparkling gem.

The total amount of negative brush discharge may be used to estimate the quantity of electricity being generated. Unexcited or inactive sections of the apparatus can be detected by the absence of the usual brush or glow discharges upon the corresponding collecting combs.

To determine the potential limitations, the degree of insulation and the presence or absence of internal wasteful discharges, the operator runs the machine at usual speed, starting with about one inch air space between the discharging rods of the prime conductors, gradually increasing the distance, he observes the luminous manifestations. If, with from four to five inches of air gap, internal sparking occurs between the comb-holders and the stationary plates, or their supporters of the same side, either the parts are too closely set to each other, or the insulation is defective. As the discharging rods are slowly opened a gap will eventually be formed from which the current will begin to fall off; it may flicker, become irregular, or even entirely disappear. Simultaneously with the current's failure, there are visible internal perturbations. Whereas, with a shorter spark gap there were only harmonious, symmetrical, intrinsic manifestations previously described, now irregular or extrinsic discharges become apparent. Leaping between one or more pairs of comb-holders of the opposite side of the machine, may be seen as many purple brush discharges or indistinct aurorial bands; they may be continuous or intermittent, stationary, or shifting from one pair of rods to another. The external convective discharge is proportionately lessened because the machine is more or less completely short circuited. Crook's tubes obtained from the dealers are usually soft, i. e., their resistance is low, corresponding to from three to five inches of air space; with continued use they gradually become hard, their resistance increases until an E. M. F. capable to overcome an eight or ten-inch spark-gap may be required for their excitation. Obviously a machine with short circuits under this pressure becomes inadequate.

The remedies for internal sparking are the following:

(1.) Shorter comb-holders, this amounts to increasing the air space or thickening the dielectric.

(2.) Improvement in insulation and the quality of the dielectric. Drying the air with quick-lime (calcium oxide) or calcium chloride, very materially increases its dielectric strength. Several pounds of the lumps of unslacked lime in a closed wooden box, the top of which has been honeycombed with gimlet holes, should be placed within the case and the same replenisned at stated intervals.

When not confined the fine powder of slacked lime resulting from the chemical union of water and the oxide, becomes diseminated and renders the appartus unsightly.

Sparking between the neutralizing rod and other conductors can be arrested by moving that structure to a more remote position, shielding it with a sheet of glass or hard rubber or placing the same on the exterior of the case. Because all disruptive discharges have their origin from the positive side of the generator that portion requires the strongest insulation. The study of the passage of high tension currents from induction coils, through Geissler tubes teaches us that they are always disruptive, that the positive discharge is excentric and cork-screw shaped, like the rings of smoke emitted from a railway locomotive, whereas the negative discharge is through the center of the tube, rectilinear in propagation.

As hard rubber is over ten times stronger than air, as a dielectric, large washers made of that material may be interposed between the revolving plates, they should be from twelve to fourteen inches in diameter, nearly filling the space between the axle and comb supporters, only allowing sufficient room to clear the holders when the apparatus is in operation. The electric current from a static machine made intermittent by spark gaps is disruptive in character, it will strain the tube in direct proportion to the length of the air spaces, the interval between the pulsations and the voltage used. Without sparking intervals the discharge is steady, uniform, continuous, undirectional, high tension, not disruptive and nonoscillatory, hence the strain upon the Crooke's tube is at a minimum. The static machine is the only devise ever invented capable of generating this variety of current.

BUFFALO, N. Y.

Alfred E. Dean, of 73 Hatton Garden, London, has issued a catalogue entitled Radiography. The subject matter does not indicate its title, since the contents are almost entirely devoted to D'Arsonvalisation, or the medical employment of currents of great frequency and high potential. The folder has sixteen pages and is beautifully illustrated, showing apparatus, electrolytic interrupter and patient under treatment. There is a short review therein on Auto-Condensation and Auto-Conduction.

Physicians who desire to be posted in what is being done in x-ray work should read the American X-Ray Journal. Subscribe now.

X-RAY BURNS.

BY J. N. SCOTT, M. D.
LECTURER ON ELECTRO-THERAPEUTICS, UNIVERSITY MEDICAL COLLEGE.

I should like to see the subject of x-ray burns taken up and discussed further. In three years work I have had no so-called "burns" until recently.

In the beginning of the work I escaped many of them because I placed the tube some distance from the patient in order to get good definition, and for the last two years I have always placed a rubber sheet over the patient as a precaution, and always place the tube eight inches from the patient for exposures up to ten minutes, and if I make several exposures aggregating more than ten minutes, I place the tube ten inches away.

About two months ago I made a ten-minute exposure of a patient's neck; she was very nervous and inclined to be hysterical—age 23. About one year ago she had been in a railroad wreck and nervous symptoms dated from then.

Before having the picture taken, she had been told the ray would burn her, and she firmly believed it, although her physician and I told her there was very little danger.

About three hours after the exposure, the side of the face next the tube became red and swollen, and she complained of considerable pain. The swelling and pain subsided in five days, and one week after the first exposure I made a second, and she fainted at the end of five minutes. She was accustomed to faint after any excitement.

Six hours after this exposure her face began to swell again, this time the swelling lasted two weeks, and the skin came off; but there was no ulceration, and she is now doing nicely. This case is peculiar in that the effects were manifest so soon after the exposure.

In another case, I made two exposures of the hip of a young lady 16 years old, but very large for her age. Each exposure ten minutes; each tube ten inches from body. I also used the rubber sheet. Second exposure was one week after the first.

About one week after the second exposure, the patient noticed the hands were inflamed and tender. During the exposure the hands were folded across the abdomen. Four days after this, the abdomen became inflamed and very tender, accompanyed with considerable pain.

The skin came off, a few points ulcerated; inflamation lasted six weeks. In making the exposure the anode was directly over the hip joint, and the axis of the tube was parallel with body, the anode end of tube was toward the face. This case is peculiar because the back of hand, which we would think would be last to be affected, was first to be involved. That the hip under anode was not affected, but that the abdomen which was much further from the tube, was burned.

Until I had these cases, I would have said, like many others, "that there was no necessity of burning a patient, and that when it did occur, it was carelessness in holding the tube close to patient, and making a long exposure, or a number of short exposures close together." But I have changed my opinion.

I would like to have the following questions answered and discussed.

Do some patients have an idiosyncrasy for the ray? What is the best method to prevent burns? Is there any class of individuals more susceptable to the socalled "burns" than others?

What is the socalled burn due to?

Is it due to an effect on the trophic nerves, or to a chemical action set up by the currrent?

Kansas City, Mo.

The serial articles on static currents, written by Dr. Jno. T. Pitkin, M. D., of Buffalo, N. Y., and printed in the American X-Ray Journal, are most timely, and should be studied by every one interested in electricity and the x-rays.

PRO ET CONTRA.

By J. Rudis-Jicinsky, A. M. M. D.

We all know how quickly the hope sprang up that the x-ray might be the best means in diagnosis of the presence of foreign substances in the body, in bone-surgery, diseases of the chest, etc., and how many disappointments followed its application on these lines. Very early in the history of the x-ray, it was found that we have to deal only with a shadow, with all the limitations which the term implies. By repeating experiments, research, facts, experiences and better technique, we are now able to do work that is much more successful. In speaking of this branch of surgery and medical science, I believe that those who use the x-ray in their practice, will agree with me that they have derived little or no benefit from books on this subject, but have been compelled, like myself, to study and learn the art of practical radiography in the hard school of experience.

If we all remember that we are dealing with a shadow, which may be easily exaggerated or changed by position, a shadow not only treacherous, but lacking in the dimension of thickness, we will not and cannot accept radiographs made without the proper proof that the subject was placed in a certain and definite position, which is marked on the picture by a fluorometer, giving accurate cross-section. This is a convenient appliance that can accurately locate a foreign body, determine dislocations and give correct shadow of fractures. This method of the photography of the invisible is absolutely reliable, and indispensable for securing accurate radiographs, as it entirely eliminates the element of distortion. But, nevertheless, you will hear often, conflicting statements, so that the physician unfamiliar with the work of the unknown ray, but witnessing the performance of splendidly handled apparatus, would be amazed to read the statements by well-known men, declaring "x-ray a failure," or, "of not of much utility to the surgeon." Such cases would seem impossible with the evidence of his eyes; but they are creditable, if we apply them to the radiograph, made without the stamp of truth, without the evidence that a flurometer was employed.

There is no question about it that you may deceive the sense of touch, but not so easily the eye, supported by some measure which is absolutely unerring in its diagnosis. It is said, "that in a few cases of fracture the x-ray will give no information which we are unable to obtain by any other method, but in a large majority of the cases of fracture, we are able, as said, to determine, by physical examination, the exact condition of affairs jnst as readily as we are by means of the x-ray."*

Every expert and surgeon will be very much surprised at such a statement, knowing that fracture of the slyloid, for instance, occurs in four out of five cases examined for Colle's fracture. This condition of affairs never could be made out by cruder methods (Thomas, Beck, etc). If there is a fissure fracture, even with close approximation, the x-ray will always show the fissure, but the exact condition might not be made out just as readily by physical examination.** With the help of the x-ray a local cranial wound may be much better examined than in the usual way. If fracture exists, whether it is simple, compound or complicated, with fissuration or depression, is determined in five to ten seconds, without any danger of complication.***

But the main thing. The x-ray will help us to make correct diagnosis and observe ***through the dressing,*** growths of the callus, or, ***photograph through a plaster of Paris over case,*** after an attempt at reduction, and see if proper approximation of the fragments had been accomplished, and find, perhaps, sometimes, that the union did not and could not take place.* This, under no circumstances, could be made out by other means of diagnosis. Or, if we have a case of suspected fracture and dislocation, or both, where the swelling will not allow any digital examination on account of the pain, or the inflammation which masks the true condition, the simple application of the x-ray at once reveals the status present, without any discomfort to the patient and great satisfaction to the surgeon.

"It has been the observation of every railroad surgeon, that it is quite impossible sometimes, to form a correct estimate of the amount of destruction suffered by the tissues,** and bone especially, in a railroad crush, when the patient is laboring under a great shock or pain. But with the help of the x-ray, we may see every particle of the crushed bone through the preliminary dressing, and determine if amputation is necessary.

And this is done withont general anesthesia. How often is the operation really of secondary importance, as compared with the dangers of anesthesia in such cases.

The value of the x-ray in fractures, therefore, if we use the fluorometer, cannot be disputed any more. But, if we choose, we may try our sense of finger touch and determine the condition of affairs the old way and be protected and sure the new way. With reference to the presence of foreign bodies and their detection by the aid of the x-ray, they are readily seen and easily located without deviation, by using the fluorometer, but not otherwise.*

What we need is a ***portable apparatus,*** which will be most valuable for the surgeon. An induction coil which gives nominal 10″ spark, could be specially designed with condenser and commutator and excited by lithanode, portable batteries, with about six cells of 30 ampere hours and interrupter. Such apparatus, which could be portable (see plan), so that it can be carried from house to house, or used in country practice, as many patients cannot be taken to the office of the surgeon, would do so much good, especially if so constructed that the flurometer could be applied just as well.

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*Harris: Western Medical Review, February 15, 1900 (discussion).

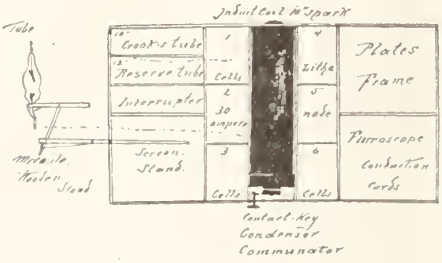
**Bernays: Same.

***New York Medical Journal, December 2, 1899. By the author.

*Western Medical Review, February 15, 1900. By the Author.

Lord: Journal A. M. A., March 17, 1900.

*Some Lessons from the Poetical Application of the Roentgen Rays to Surgery, Hall-Edwards, Birmingham, February 1900. "Practical X-Radiance," Scott, American X-Kay Journal, July 1899. Dennis, same, February 1900.



Cedar Rapids, Ia.

STATIC MACHINE.

FRUITA, COLO., July 24, 1900.

DR. HEBER ROBARTS, EDITOR AMERICAN X-RAY JOURNAL.

Dear Sir:—In the March number of the JOURNAL you gave an account of my "improvised static x-ray machine."

I notice it has become quite customary to call a static electrical machine an x-ray machine. That seems quite natural, inas-much as the static machine has come into such general use since the advent of the Crooke's tube. I think, however, it would be better to call a static machine by its right name, as it is used oftener as a therapeutic agent than as an exciter of the x-rays.

I have received numerous inquiries as to how I improvised said machine. I would be glad to give a detailed account of how to construct an electrical machine, but the same would be rather tedious and of little value except to those possessed of considerable mechanical ability as well as perseverance.

Being an amateur mechanic myself and having a shop and tools of my own, I undertook the task of constructing a static machine of the Toepler style. The glass was carefully tested for its electrical qualities before being cut and drilled for the plates; the wood was carefully dried; hard fibre was tried for insulating instead of hard rubber, but was a failure. Careful drawings were made of all parts before constructing, and different combinations of the plates were tried, so as to get the best results.

I have made my 8-plate machine into a 16-plate, 8x27 in. revolving and 8x30 in. stationary. It runs very smoothly in ball bearings; it seems to do good x-ray work when run at 250 to 300 revolutions per minute, but has been tested at a much higher speed.

I find that a glass case has greatly improved the action of the machine, as well as being a necessity to exclude dust. The Leyden jars can be changed at will, there being four sizes.

There seems to be a constant inquiry as to how long sparks can be made on a particular machine, and I will say that I can usually get up an 11-inch spark, and a good deal of the time a 12-inch. Our climate is, however, particularly favorable to static electricity.

I know of nothing more scientific or useful for a physician to place in his office than a static electric machine. It is both ornamental and useful; by means of the spray or breeze, or whatever form we choose to use, we are enabled often to relieve our suffering patients immediately. We do not have to wait for special occasions to use the "static;" it can be used daily, and with the greatest comfort to the patient, whether a delicate female suffering from some reflex irritation, or a robust man suffering from an attack of lumbago.

One who possesses an efficient static machine, has an inexpensive and sure method of using the x-rays. What can be more satisfactory than a fluoroscopic view of a fractured bone, even through the splints and bandages, or to see the diaphragm as it rises and falls with the respiratory movements.

In using a vacuum tube which is hard and causes leakage along the conductors and where joined to the tube, I have found no better means of stopping the leakage, than by inserting the conductors in rubber tubing, as is usually recommended, and then wrapping ends of vacuum tube and down on the rubber tubing for a few inches, with ***rubber bandage.*** If the conductor is flexible and inserted in rubber tubing, and then wrapped with rubber bandage, say 1½ inches by 3 feet, we have an ideal conductor and one easily changed, much more so than when friction tube is used.

Y. M. G. BEARD.

In Dr. Kolle's excellent article, entitled "Direct Method of Measuring X-Ray Intensities," published in the July issue of the AMERICAN X-RAY JOURNAL, we are sorry to have to correct typographical errors. Second column, third line, should read "a contact key" and fourth line should read, "to facilitate making."

In Miss Sharp's article, referred to in another place in this issue, we wish to emphasize two of her observations for the benefit of all x-ray workers. She says: "There are four details of the operation which require regulation, the distance of the tube from the skin, the length of the sitting, the strength of the current and the vacunm of the tube." Again sbe says: "How, for instance, are we to reconcile the different and exceedingly opposing actions of the x-rays which have come under my observation ? There is the revitalizing action as shown in their effects on scar tissue; there is the antiphlogistic, as when the psoriasis spots fade away; there is the inflammatory, which may go on to necrosis; and there is yet another, which I shall go into more fully presently, viz., bactericidal. I must also mention, though I have had no experience of it, the analgesic action."

ANSWERS TO INQUIRIES.

J. W. K. We do not know of any journal devoted exclusively to static currents.

J. M. H. When the loop at either end of an x-ray tube is broken the connecting wires to the machine may be held in place by adhesive strips.

A. D. Fracture of a stationary plate does not materially alter the efficiency of the static machine provided the piece is retained in place.

C. L. C. The purple streamers that pour out from an electrode towards the patient is called "effluve."

F. B. C. Lupus vulgaris is cured by means of the x-rays. The writer has effected a cure of lupus vulgaris of the nose whose mother and grandmother had died of the same disease. The patient is perfectly well four months since the treatment. It required fifty treatments of twelve minutes each with a soft tube ten inches from the face. Inodular tissue that had formed from previous surgical treatment almost wholly disappeared.

M. B. In an article entitled "The X-Ray Treatment of Skin Diseases" by Margaret M. Sharp, M. D., read before the Roentgen Society and published in the Archives of the Roentgen Rays, you will find the technical use of the x-rays for the removal of hairs.

H. L. It is known that x light is generated from the cathode. In Rollins' long serial, "Roentgen Rays," he says, "in the process of preparing a good x-light tube, the gas is removed more rapidly from the anode than from the cathode." But both terminals yield Roentgen rays. He further states that, "lines of swung ether units between the terminals, and free ether particles of electricity at each terminal; as we increase the energy applied to the tube, there comes a time when the dissociated ether collected about the gas particles in the terminals, tears them off and rushes them across the field, causing them to strike the opposite terminal with such force as to raise them to such a high temperature that they become centres from which x-light originates."

J. H. M. X-ray tubes do not increase their x-light output the "longer they are used." If this were so, then it would be better to let the machine run indefinitely till the x-rays penetrated iron walls. Modify the term. Tubes improve by use, but not regularly nor continuously. The best tube, however, must be "worked up" for best radiance.

B. B. The x-rays are used for other purposes than diagnosis, notably for the cure of lupus, sycosis, eczema, favus, wounds of the hairy parts of the body, acne, furunculosis, elephantiasis, epilation, scars, pus ulis, comedones and retinal impairment.

We desire to acknowledge the receipt of a number of radiographs received to-day from Miss Elizebeth Fleischman of San Francisco. The high grade work of this lady radiographer deserves public commendation for her painstaking and tireless energy to promote x-ray science. The excellence of her work has been mentioned through the lay press but especially commented upon by medical and scientific journals. Possibly the highest distinction one could receive in this country has been awarded her by the head of the medical department of our Government. One of the radiographs received from Miss Fleischman is of the ape family. In it are plainly seen the large intestines distinct from the small convolutions, the stomach is clearly seen, the liver, heart, and lungs readily outlined. The picture is twenty inches in length and the articulations are clear throughout. The radiograph of a fish, red snapper, is certainly the best we have thus far seen. Every detail of the harder structure of the fish that could be seen under dissection with the unaided eye is here shown.

An interesting specimen is that of a head showing non-erupted second molar above and below and the still more delayed wisdom teeth which are yet in the pulp. This entire specimen is unique, head and trunk, and we desire to know more about it. The lizzard and hands are all good.

If Miss Fleischman is a fair criterion of what other women may do in radiography it will be well for us that the infection should spread. Miss Fleischman has improved the art and made diagnosis more certain and she has succeded financially and socially. She is a member of the Roentgen Society of the United States.

Roentgen Rays for Examining Coal.—A long abstract of a communication of Prof. Courot to the Society of Mineral Industry in St. Etienne, France, on the use of Roentgen rays in the estimation of the impurities in coal. The method is based upon the fact that Roentgen rays traverse such hydrocarbons as wood and such an element as the diamond, while silicate of aluminum or silica are opaque to them, as previously noticed in the Digest. His apparatus is described at some length and several of his radiographs of various coals and products are reproduced. "As this method of analysis does not reveal the condition in which the carbon exists and as it is impossible to determine the percentage of sulphur while approximating the amount of ash, it would seem to have greater scientific than technical value."—*Eng. E. Min. Jour.*, March 17.

"ARCHIVES OF THE ROENTGEN RAY."

We intended to abstract from the many valuable articles which appeared in the Archives of the Roentgen Ray for May, but the fullness of the editorials therein we prefer to reprint.

"There is no startling advance, nor anything very novel, to chronicle in the x-ray world, yet the value of the processes of radiography is being more and more recognised, and the physician is coming into line with the surgeon in making use of them.

The articles in our last issue, which we translated from the *Journal d'Electricite Medicale*, on pleuritic effusions, and that read at the February meeting of the Roentgen Society by Dr. Walsham, illustrating cases of tubercular disease of the lungs and aneurisms of the aorta, printed in our present issue, show that for the future the screen and the radiograph must play an important part in the diagnosis of diseases of the chest.

It will be a great gain to medical science if the assertion made by the author of the latter paper, that it is possible to diagnose the existence of tubercle in the lungs by an x-ray photograph at an earlier stage than has hitherto been possible by percussion and auscultation, be borne out by further experience. The being able to do so may lead, in some cases, to an earlier treatment and consequent cure of the affection. It will also be useful for prognosis to be able, as the former paper shows is possible, to distinguish between pleuritic effusions originating in a chill, and those which are caused by the presence of tubercular foci in the lungs.

The present number contains a paper by Mr. J. H. Gardner, who has had valuable experience in Sir W. Crookes's laboratory, and whose contributions to the Roentgen Society are always of interest. The paper contains a series of investigations for determining the "relative values of the different known methods of producing Roentgen rays with different degrees of absorbability." The apparatus employed is described and illustrated with numerous figures; and the ingenious standard measure or scale for comparing different results and expressing them numerically is specially interesting. The photographic method was employed, instead of the "platinum-aluminum window" used by Professor Roentgen for his experiments described in the paper, of which a translation appeared in the Archives, vol. iii., p. 80 *et seq.*

On Plate XCI. is an excellent radiograph of an arm, from which the radius had been removed some time previously, showing commencing growth of new bone, taken by Mr. Shenton at Guy's Hospital. Also two curious cases of exostosis of the metatasal bones, by Dr. Rodman of East Sheen.

We hear from many sources that the x-rays have been extensively used at the war in South Africa. Many of the wounded soldiers who have been sent to their homes to convalesce, or to the great military hospitals for treatment, have been allowed to bring with them prints of the radiographs taken of their injuries, which they exhibit to all comers with much pleasure and pride.

Plate XCII., which depicts two views of the femur of an officer wounded at the battled of Magersfontein, shows well the power which a bullet has to shatter a long bone. The progress of the case exemplifies also the rapid way in which wounds inflicted by the Mauser bullet heal. This is to be attributed partly to the nature of the wound, partly to the use of antiseptics, but is declared by the special commissioner of the British Medical Journal to be mainly due to the salubrity of the climate, where open-air treatment is virtually carried on, and wounds consequently seldom take on a septic condition.

On this plate is a photograph of the bullet which was extracted from the gentlemen's leg; it is distorted in a remarkable manner.

On the same plate is also a photograph of a Mauser bullet of the natural size and shape. The bullet is of lead, with a coating of nickel, and weighs 226 grains, or nearly ½ an ounce; it has a diameter of 0.376, or a little over ¼ of an inch, and is 1.18 inch long. The muzzle velocity of the Mauser rifle is 2,388 feet per second, and at 40 feet from the muzzle the bullet will pierce 4½ feet of deal. Its extreme range is 2½ miles, and its trajectory is very flat.

The Scientific American says: Paradoxical as it may seem, the Mauser rifle is a merciful weapon, and stands only second to the Red Cross in alleviating the horrors of war. The wounds, apart from vital spots, are pricks as compared with those of the large-bore rifles, and the impossibility of fighting with success in the open has driven the soldier to cover, with this result, that, in spite of desperate bravery on both sides, the percentage of losses has been the smallest in the history of warfare."

This is, however, another reason for the favorable course which the wounds have followed in this war, and the Government and the R. A. M. C. deserve the credit for it. According to the Times, Sir William MacCormac is reported to have said that "the improvements in the medical arrangements for this war are so marked that it is quite impossible to make any comparisan with the conditions in previous compaigns. Nothing that prevision could suggest or money purchase was wanting anywhere."

He also said that the wounds inflicted by the Lee-Metford and the Mauser bullets were very similar in character, and that both were certainly less fatal than were the large projectiles in former wars. The chief characteristics of the wounds he had seen had been the very small entrance and exit; and the intervening soft parts had been damaged to the least possible extent. He had seen no evidence of explosive bullets.

Ninety-five per cent of the cases in the general base hospitals recovered and were discharged, a very large proportion being able to return to duty at the front.

"The Roentgen rays," says Sir William, "were used as a matter of course, and nearly all the hospitals are now equipped with the apparatus for this method of diagnosis. It was always used previous to making exploration for a bullet, and an officer was told off especially to take photographs by it. An additional apparatus, which not only determines the place of the bullet, but also shows its depth from the surface, was proving of great value. The Boers also had the x-ray apparatus, and he saw it working at the German hospital at Jacobsdal."

With reference to the question of localization, we publish an original communication from Professor Barrell, of University College, Bristol, on a new method, requiring neither plumb-lines nor threads, which well deserves the attention of our readers. We understand that it will be exhibited at a future meeting of the Roentgen Society.

A society called the "Roentgen Society of the United States" has been organized in America on the lines of the kindred Society of London. Dr. Heber Robarts, of St Louis, Mo., has been elected President, and Dr. J. Rudis-Jicinsky, of Cedar Rapids, Ia., is Secretary. Upwards of 100 members have joined the Society, and the subscription is five dollars.

THE AMERICAN X-RAY JOURNAL, edited by Dr. Robarts, is "accepted as the official organ of the Society," and members receive the journal free. Its objects are the "advancement of the knowledge of practical x-ray work and allied arts and sciences." Its membership is open to members of the medical profession and to all those interested in x-ray work scientifically. Mr. Nikola Tesla has been named first honorary member.

We wish this young Society great success; and, from the energy which our cousins over the water infuse into all they do, and from the excellent start made, we feel sure it will both deserve and obtain it.

Generalized Cathode Rays.

Sagnac.—A French Academy note in which he endeavors to bridge the gap between ionized air molecules and cathode rays by the following considerations. Let the gold leaf of an electroscope be charged positively, and let the electroscope be divided by a metallic net from a space traversed by Rontgen rays and placed under the influence of another electrostatic field. Then the discharge of the gold leaf which takes place in the absence of any external field, is accelerated or retarded accordingly as the external and internal fields are of the same or opposite directions. This acceleration or retardation is not due to the mere presence of the external field, since that field produces no effect unless the x-rays are traversing it. Hence it must be due to some action of the ionized molecules which penetrate into the interior of the electroscope through the meshes of the net. If they have sufficient velocity on passing the mesh, they will skip over from an external to an internal line of force, and thus increase decrease the internal flux which is slowly discharging the gold leaf. This is another case of bombardment by charged particles which, on gradually reducing the pressure of the air and thus increasing their velocity, might be made to pass by insensible gradations into cathod rays.—*Comptes Rendus. Feb. 5; Electrical World and Engineer.*

Becquerel Rays.

Becquerel.—A French Acadmey paper giving an account of experiments in which he studied the dispersion of Becquerel rays by the photographic method. A scientific definition of the position of each ray in the "magnetic spectrum" is obtained by taking the product of the field into its radius of curvature. The product is constant for each ray, and varies from 360 to 2600 c. g. s. units.—*Comptes Rendus*, Feb. 12; abstracted in Lond. *Elec.*, March 2.

The Rontgen Society, London.

In his presidental address to the Rontgen Society, Mr. Wilson Noble pointed out that the greatest recent advance in Rontgen ray work was the practical realisation of stereoscopic radioscopy, the allusion, no doubt, being to Mr. Mackenzie Davidson's highly successful instrument, exhibited at the last conversazione of the Royal Society and already noticed in our columns. Mr. Noble said there were many things difficult to see, or, at any events, to distinguish with certainty when seen as a flat surface, but which came out with wonderful clearness when seen on a flat surface. One had only to look at an ordinary stereoscopic slide, first without and then with the stereoscope, to appreciate this. The same holds with the Rontgen ray stereoscope; more particularly was this the case with objects showing but little contrast and ill defined, such, for instance, as the early patches of tuberculosis in the lung. He could not but think that diagnosis of this disease would be enormously facilitated when visual stereoscopic radiography become general. Mr. Noble said that one noticeable feature of the present practice was the adoption of the influence machine by many workers. It should not, however, be forgotten that though the influence machine is excellent for screen work, it involves too long exposures to hope, its present inefficient state, to compete with the induction coil in photography. Mr. Noble said that the Rontgen rays had done admirable service on the battlefield and in the hospitals in South Africa, notwithstanding the great practical difficulties that had to be overcome in keeping tubes efficient, in conveying and charging accumulators, &c. Minor advances had been made during the past year in the way of shortening exposures and improving definition.—*Electric Review London.*

Inorganic Iron.

Henry in a recent Medical Essay after referring to the hypoplasia of the blood forming organs noted in chlorosis by numerous observers states that the essence of the affection lies in a reduced amount of hemoglobin and consequently feeble oxygen carrying power in the red blood cells, and that this deficiency is due to inherent biochemic peculiarities in the cell itself which make absorption difficult. Referring to the use of iron, he states that on account of its marked hemoglobin-genetic power inorganic iron is the form in which the remedy should be administered. In three chlorides, (liq. ferrisenic) a serious disadvantage of iron preparations—constipation—is completely obviated by combination with the glandular stimulants bi-chloride of mercury and arsenic in small assimilable doses. Give in milk or water.

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The Antikamnia Chemical Company have forwarded to us from their London House, No. 46 Holborn Viaduct, samples of their five-grain antikamnia tablets, and also of antikamnia and codeine tablets. The former are so well known that it seems hardly necessary to do more than refer to them as an unequaled analgesic. The antikamnia and codeine tablets contain four and three-fourths grains of antikamnia and a quarter of a grain of codeine. This is a valuable combination, the synergetic effects being all that could be desired.—Extract from *Dublin Medical Journal*, March 1900.

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CONTENTS VOL. 7 NO. 2.

Roentgen Society of the United States. By Dr. J. Rudis-Jicinsky.

Excitation of the Crooke's Tube by the Static Machine. Chapter VII, by Dr. J. T. Pitkin.

X Ray Burns. By J. N. Scott, M. D.

Pro Et Contra. By J. Rudis-Jicinsky, A. M. M. D.

Static Machine. By Y. M. G. Beard.

Answers to Inquiries.

Roentgen Rays for Examining Coal.

"Archives of the Roentgen Rays."

Generalized Cathode Rays.

Becquerel Rays.

The Roentgen Society, London.

CONTENTS VOL. 7 NO. 3.

Excitation of the Crooke's Tube by the Static Machine. Chapter VIII, by Dr. J. T. Pitkin.

Therapy of Encephalocele.

The Pathology of Fracture of the Lower Extremity of the Radius.

Missouri School for the Blind.

Negatives Developed in Light.

Discontinuity of Cathode Radiation.

Home Made Static Machine.

Answers to Inquiries.

The Downfall of the Atomic Theory.

The Roentgen Rays with Associated Phenomena and their Application in Dentistry.

Book Reviews.

ARTHUR W. GOODSPEED, Ph. D.

Assistant Professor Physics, University of Pennsylvania, Philadelphia.

The American X-Ray Journal.

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EXCITATION OF THE CROOKE'S TUBE BY THE STATIC MACHINE.

Static Magnetism.

By John T. Pitkin, M. D.

Chapter VIII.

When a pebble or other missile is thrown into a pond of water, an eccentric wave extends outwards from the point of contact of the projectile, in a circular direction, with a force which varies inversely as to the square of the distance.

During the period of agitation the water does not travel forwards, it only rises and falls, the mechanical force alone is propagated. In a similar manner an electrical conductor surrounded by air, excited by a static machine, a dynamo or a battery, causes the establishment of vortex motion called magnetism in the environment; here again, the medium (the atmosphere) does not travel outwards, the energy only is transmitted.

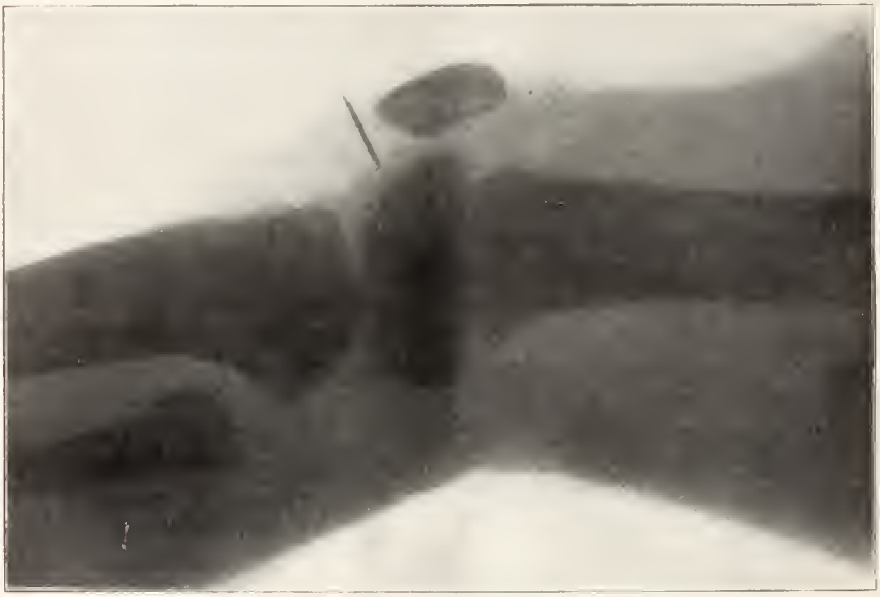
In the differenciation between static magnetism (Electro-static lines of force of the older writers) on the one hand, and static electricity on the other, the student should ever bear in mind that, whereas, in the passage through air, the former goes through the medium by contiguity, the latter carries the medium along with it. The former is invisible; the latter can be seen in a darkened apartment as a spark, glow or brush discharge. Magnetism can be felt as a slight pulling or pushing force. Electricity is palpable as a draft, wind, spray, breeze, cobweb feeling, or sudden shocks of varying intensity. Magnetism is silent; electricity audible, from a low, crackling or sibilant sound, to the loud detonations of lightning.

The atmosphere surrounding our earth may be considered as a huge magnet, the excited static machine has a similar envelopment. As the glass plates are better conductors of magnetism than air, the lines of force converge upon their surfaces, they are conveyors of a proportionately large amount of magnetic energy.

Metallic conductors presented to the magnetized plates, become recipients of a convective electrical flow.

After the machine has been in action a few moments, the glass plates reach a condition of excitation called magnetic saturation, which represents the maximum volume of energy primarily obtainable from a given apparatus; this amount is invariable, and independent of the speed at which the instrument is operated. In this condition it is supposed that the molecules of glass have been completely polarized.

Whereas, in the low tension, direct current electrical machines called dynamos and motors, the electro-magnets constituting the fields are usually placed laterally, one on either side. In the construction of the high tension, direct current generators called static machines, the fields are usually made up of two sets of oblong glass plates, and one set is placed above the other. The revolving electro-magnet of the dynamo, or armature, finds its analogue in many glass wheels of uniform size and composition seperated from each other by washers all of which are firmly fastened together, and revolve en masse upon a common axle. The revolving plates vary from two to sixteen in number and from twenty-eight to thirty two inches in diameter. The washers are usually circular pieces of wood from four to six inches in width, one half of their number are one half of an inch thick, the remainder are about one inch in transverse dimension. Thick and thin washers alternate with each other in position upon the axle, they seperate the glass wheels and provide interspaces beyond their free margin for the reception of stationary structures.



FRAGMENT OF A NEEDLE IN THE KNEE JOINT.—Skiagraph taken with a Holtz machine, having twelve revolving 28-inch plates; two half-inch spark gaps in circuit.

Corresponding to the thick washers are intervals into which the collecting combs and their supporting rods extend. Each narrow interspace is for the reception of one superior and one inferior stationary plate. As wood is a fairly good conductor of static electricity and liable to divert a portion of the current, some makers cover the steel shaft with a hard rubber tube or sleeve, this prevents the revolving plates from making a metallic contact which could dissipate their magnetism and insullates the axle from disruptive discharges. Other makers invest the exterior of the washers with hard rubber to lessen the tendency to internal electrical discharges not only into the axle but also between the comb holders of opposite sides favored by the circular pieces of wood, when the external current meets with considerable resistance. Solid hard rubber washers placed over a rubber-clad axle would provide the most effectual means of overcoming leakage into the axle, lessen the tendency to internal disruptive discharges when the machine is in operation and assist the revolving plates to retain their residual magnetism during inaction. In the excitation of the Crooke's tube by the static machine, with a new, soft tube, of low vacuum, in sample series the composition of the washers is of little consequence but after the tube has become hardened by use or if resisting spark gaps are placed in the circuit it may be of prime importance. In the construction of a static machine for x-ray purposes cost of material should be a secondary consideration.

All of the plates of the Holtz machine, stationary and movable, are made of the selected thinner grades of double thick, annealed, crystal, dielectric glass; they should have several coats of varnish, shellac and amber to overcome their hygroscopic tendency. When not well coated the residual magnetism may treak away during periods of repose, the charge is lost, and a Toepler, a Wimhurst or other secondary device becomes necessary to bring the machine into action. The tendency to loss of charge is greatest during the heated term when the atmosphere is surcharged with humidity and reaches the highest point of fractional saturation. Loss of charge may usually be prevented if the following directions are followed. In the construction of the machine all of the plates should be free from metallic or other good electrical conductors, their occluded moisture driven out by heat, the pores well filled with amber varnish and shellac and their exterior covered with the same material.

The instrument proper inclosed within a tight case kept dry by measures previously described. In operating the instrument, always turn the revolving discs towards the points of the serrated margins of the semilunar metallic conductors which project from the stationary plates at either end of the apparatus, if allowed to run in the opposite direction the charge is usually dissipated. Give the instrument daily use. Let the Leyden jars rest upon large glass plates. Leave the discharging rods wide open at night. The prime conductors, jars or discharging rods rods should not be handled after the machine has ceased to operate. Multiplicity of plates favors retentivity.

The more simple Holtz machines have a single upper and a single lower stationary plate on either side of which a movable wheel revolves. In the more modern complex machine employed for x-ray work the number of revolving plates has been increased to sixteen, representing eight simple machines, inclosed within a single case, operated in multiple relationship to each other. The writer is the proud possessor of such an apparatus.

In the excited static machine one set of stationary plates is charged with positive, the other with negative magnetism. As the revolving discs pass by the stationary fields, their presented surfaces become inductively charged with the opposite polarity, e. g., if the superior stationary plates are negative, the uppermost half of the wheels will be positive, conversely the inferior plates being positive the corresponding segments of the revolvers will be negative. The two sets of stationary plates are seperated from each other by an intervening atmospheric space, four or five inches wide, called the window of the machine. At either end of the instrument, extending into the window, are placed electrical conductors, which serve to relieve the revolving discs of the energy accumulated during each semi-revolution.

BUFFALO, N. Y.

THERAPY OF ENCEPHALOCELE.

In the International Medical Magazine for April 1900, Dr. Carl Beck has contributed an excellent article entitled "Contribution to the Therapy of Encephalocele." The article contains ten electros, two of which are radiographs showing to what extent the tumors connects with the cerebral mass. After describing in his masterly style the diagnostic features of meningocele and hydrencephalocele Dr. Beck takes up encephalocele proper and says:

"The contents of encephalocele proper consist of solid cerebral tissue. While in the large majority of cases differentiation is easy, great diagnostic difficulties are sometimes offered, just as in spine bifida; and as in spine bifida it was reserved to the Roentgen rays to clear up some doubtful points, especially the question of the size of the opening in the bone and the presence and expansion of the cerebral substance. (The value of the x-rays in the dignostic condition of spina bifida was printed in the American X-Ray Journal.)

It goes without saying that the rays are also useful in differentiating angioma, lipoma, soft sarcoma and cephalhematoma from serous and dermoid cyst. The article is original and deserves the careful study of surgeons.

THE PATHOLOGY OF FRACTURE OF THE LOWER EXTREMITY OF THE RADIUS.

Dr. F. J. Cotton of Boston, Mass., has an article in the Annals of Surgery for August, entitled "The Pathology of Fracture of the Lower Extremity of the Radius." The article is richly illustrated with cuts and radiographs showing some of the many varieties of fractures that occur near the wrist joint.

One of the radiographs shows unmistakable touching a custom which should not be practiced unless specifically mentioned. It is very seldom a good thing to touch a negative for the reason that it is impossible to imitate the radiographic shadow.

In speaking of the shadow picture Dr. Cotton says: "It may be said in advance that there seems to be no single form of lesion described from any actual specimen, which is susceptible of demonstration in the shadow-picture, that has not been so demonstrated in one or more clinical cases; nor has the x-rays discovered any previously undescribed lesions. He further says: "Valuable as the x-ray is, it is obviously not the best basis for scientific classification of lesions." Again he says: "It needs no argument to show that the x-ray plate, valuable as it is, is in many ways a rather imperfect record."

Dr. Cotton has drawn conclusions for the matter of his paper after examining "specimens as have been available for examination, on description of plates of other specimens, on autopsy reports, on cadaver experiments by the writer and on other such experiments found recorded."

In studying this valuable paper it is clearly seen that the writer has been largely persuaded in his opinions from the many schematic plates that have been before him; and the sayings of the fathers of surgery have led him to deceive himself in the interpretation of the radiographic plates. It is true that the careless taking of a shadow-picture is a poor record, but it is also true that a radiograph taken with the distortions corrected (distortion by position and normal distortion) gives a perfect record a record for accuracy that can not be had by any other known means. Without these distortions corrected it is impossible to know at what point in the picture the direct rays impinged upon the subject. When this is known and so indicated by impervious section on the plate, the interpretation of the radiograph is possible. It cannot be insisted on too strongly that in making radiographs a given diameter must be fixed which should be at right angles with the subject. When thus made dissection can not furnish so perfect information.

The x-rays may not have furnished other than "previously undescribed lesions" of the lower and of the radius and ulna. Such discovery is not needed. It has furnished us with the knowledge, that instead of one ulna styloid being broken in twenty Colle's fractures, as previously taught, there are three in five such fractures. This is of great clinical importance. It has also taught us the knowledge of undisplaced fractures of the lower end of the radius, a matter far reaching in clinical results. It has given us a method for positive diagnosis, which was, before, sometimes impossible to obtain. It has given us an exact means for determining the condition of the fracture after dressing.

With the x-ray we can "base conclusions as to details for scientific classification of lesions." The shadow-picture is not schematic, if made according to known unerring rules. Arbitrary diagrams, together with the weight of former evidence, cannot alter the truth.

MISSOURI SCHOOL FOR THE BLIND.

An official notice has been sent out by the officers of the Missouri School for the Blind calling attention to this as being the only institution in the state where "all who need the aid we offer" may come. This is the institution that furnished us with blind patients for x-ray test, amongst whom many totally blind were able to observe light and shadows.

Parents and guardians of blind children in Missouri should not neglect an offer to educate their children. It is a state institution and there is no money profit whatever to the managers to increase the size of the class but the spirit of duty actuated the call.

Application Blank.

ROENTGEN SOCIETY OF THE UNITED STATES.

APPLICATION FOR MEMBERSHIP.

I hereby make application for membership in the Roentgen Society of the United States.

Signed ....

Full name.

P. O. Address..

$5.00 must accompany each application. There is no initiation fee. The official organ, "THE AMERICAN X-RAY JOURNAL," free.

DR. J. RUDIS-JICINSKY.

CEDAR RAPIDS, IOWA.

We desire to correct typographical errors that occured in the valuable article by Dr. Alex. L. Hodgon, entitled "A Fluorescent Lead" in Vol. 6, No. 1 of the AMERICAN X-RAY JOURNAL, on page 695 Lumiere Voire is correct, 697 Lumire and Skiodomska is correct.

NEGATIVES DEVELOPED IN LIGHT.

Prof. F. E. Nipher of the Washington University, St. Louis, Mo., has discovered a method for developing x-ray plates in light. While photographing electric sparks and developing the negative the thought was suggested that x-ray plates might be developed without the use of the dark room. Experiments made were highly successful. These plates are shown to be negative when they were exposed to x-ray light provided they were enclosed in black paper, but they were positive if exposed to light while the x-ray was acting. If the proper time for an x-ray exposure should be one second and the exposure was continued sixty seconds and then developed in light an excellent picture can be produced which would be positive.

Professor Nipher used in developing the pictures hydroquinone but other developers may act as well. An incandescent lamp is the best to have in the room, as the degree of light can be regulated by moving to or from the lamp.

Fogging is an indication that the plate should move nearer the lamp. If already fogged a plate can be thus cleared up. Loss of detail indicates that the lamp has been too near the plate during the entire developing. It is better to start at some distance from the lamp, say six feet and with a weak developer spend an hour if necessary to obtain the sharpest details. With this method the plate can be watched during the course of development and the desired features brought out by pushing or arresting the operation.

Prof. Nipher told the writer that he expected to report further progress at which time the degree of light and distance the light should be from the plate would be approximately given.

The photographic plates made by the professor number into the thousands and some show the finest detail we have ever seen in photography. These were exposed first several days to light in a room, and

LIBRARY OF THE COLLEGE OF PHYSICIANS OF PHILADELPHIA

then exposed for street scenes several hours. One strange thing about these pictures is that moving objects as street cars, vehicles and persons walking on the street are not seen. A very good account of Prof. Niphers discoveries is given in the Electrical Review, London, Eng., but the most complete report is from the author himself in a paper contributed to the Transactions of the Academy of Sciences of St. Louis, Vol. X, No. 6.

We are in receipt of a catalogue of the "Atlantic School of Osteopathy," Wilkes-Barre, Pennsylvania, where Doctor Wm. Smith is announced as president of the faculty. Doctor Smith was formerly from Kirksville, Mo., where he gained for himself an enviable reputation as a teacher in anatomy. We, however, desire to mention the fact that Doctor Smith was instrumental in having installed in Kirksville the highest grade x-ray apparatus and accessories together with the fluorometer. He took hold of the new science in conjunction with anatomy and taught for the first time in this country the anatomy of the invisible parts of the living being. The radiographs made by him of injected subjects, using Chinese vermillion specially prepared, are specimens of the highest art. A radiograph was made by him of the pelvis and thighs of an injected subject in which the minutest vessels stand out from the arterial trunks resembling the numberless branches on leafless trees. His work and ingenuity has been mentioned in publications that we call regular. It is to be regretted that Dr. Smith after having a scholarly and professional education in Europe did not pass regularly into the special sciences for his instinctive resources are rich and useful. His mind is eager, his soul is free and his heart is even larger than his big body. When a man in public office suffers the retribntive consequences of high place it is laid to his wife that "she had the brains" Mrs. Smith is a beautiful charming woman but both man and wife have grace culture and mentality. We hope Dr. Smith's enthusiasm for x-ray work will find encouragement in his new home.

HOME MADE STATIC MACHINE.

Dr. Beard of Fruita, Colorado, has sent us some radiographs made with a home-made, one glass plate 19 inch static machine. The doctor says in his letter concerning the pictures and machine: "The machine is very crude. It shows what can be done, however, when the tube is adapted to the plates' action. I have given the plate 1,800 revolutions a minute as shown by speed indicator. I started out to see what speed the plate would stand but have concluded not to break it just yet." The radiograph of the wrist taken by this one plate machine is very good, showing the bones and articulations perfectly. The exposure was five minutes and the distance six inches.

DISCONTINUITY OF CATHODE RADIATION

An account of experiments showing that cathode rays may have a strong tendency to discharge themselves intermittently. Make a cathode beam rotate about its axis by means of a revolving magnetic field. While a continuous beam would then describe a circle on a fluorescent screen, a cathode beam only produces a series of patches arranged on the circumference of a circle. When the tube is worked by an alternating current, each active semi-period is thus broken up into a series of equidistant discharges. — First abstracted in London *Elec.*

Ferdinand Ernecke of Berlin, S. W., Koniggratzerstr 112, has issued a catalogue entitled "Roentgen Apparate." The large folder includes more than 50 pages and is richly illustrated with all the forms of coil apparatus used to generate x-rays. Every accessory is also pictured making nearly 100 cuts in all. The description of the new interrupter alone is worth the cost of obtaining one of these catalogues.

ANSWERS TO INQUIRIES.

B. G.—BECQUEREL RAYS are radiations proceeding from substance, without the existence of known energy, and having the property of the Roentgen rays. The name is taken from Becquerel who demonstrated the independent existence of the rays in contradlstinction to the observations of Henry made in 1896 to the effect that the eminating rays from sulphide of zinc were transformed x-rays. This supposition was made because the material giving off the rays had been exposed to the x-rays. These rays will produce photographic effects six inches but closer proximity is necessary to get hand shadows and metal shadows through the hand. The bones are not made visible.

Uranium having the highest atonic weight of the metals was selected by Becquerel to produce radiation, i. e., the phosphorescent compounnds of uranium was used.

The pure metal, however, produces the radiation in greatest abundance and therefore, Becquerel called the new radiation "Uranium Rays." The name has been abandoned because other substances are known to be stronger radiators.

Madame Curie, of Paris, discovered a substance one hundred times stronger in radiation than the Uranium and Tharium compounds previously known. Bohemian pitchblend was discovered by Madame Curie as having greater radiation than uranium ore and this had been the element found in pitchblend which was supposed to give off Becquerel rays.

She had the active constitutents of pitchblend isolated and discovered therein two products—compounds of bismuth and barium but with the strange difference that the compounds of the same found in other ways did not emit Becquerel rays. These products were mistaken for elements and were named "Polonium" and "Radium" whereas they were simply alotropic forms of compounds of bismuth and barium. You may read in literature upon this subject the name "radio-active bismuth" and radio-active barium" which means in effect the same thing.

Eister and Geitel has succeeded at the chemical laboratory of A de Haoen, of List, near Hanover, in making concentrated preparations of these substances, that exceed anything hitherto produced in radioactivity. It requires several hundred pounds of the ore to obtain a few grains which practically prohibits its general use. A very much cheaper product is made and with but slightly weaker radiations. These rays can be used to excite the same screen used in Roentgen rays. Hopes are now about dispelled of using radio-action substances for obtaining diagraphs of the human body.

T. S. J.—Nerves absorb the x-rays with about the same degree as flesh; large arterial trunks more than flesh because of the constituents of blood and their motion.

P. J.—I do not know of any radiograph having been taken of a foetus prior to bony formation.

A. C. K.—The X-Ray Stereoscope is a surgical instrument. With it the observer can locate a foreign body with greater certainty than with the fluoroscope. Messrs. Newton & Co., of London, England are making a stereoscopic fluoroscope designed by Dr. Mackenzie Davidson.

Isenthal & Co., 85 Mortimer Street, Cavendish Square, London, W., have recently issued an instructive catalogue entitled, "Radiographic List." The catalogue is printed on coated paper and the pages are embelished with cuts of the various types of coil machines, tubes, interrupters, Wimshurst machines and accessories used in x-ray work. The types of interrupters are especially interesting. A complete price list of all this reliable house has to sell is appended.

THE DOWNFALL OF THE ATOMIC THEORY.

The relation the atomic theory may have in explanation of inter-tubal phenomena can be better appreciated when Thompson's theory is understood. It is for this reason we print from the Electrical Review, of London, March 2d, 1900.

"At the beginning of the present century Dalton laid the foundation of the atomic theory of chemistry. The belief in the chemical atom has become more firmly established by the physical and chemical investigations of the century, and this atom has till recently successfully resisted all assaults on its indivisibilty. But the remarkable paper read by Prof. J. J. Thomson at the last meeting of the British Association, and published in the December number of the Philosophical Magazine, puts forward evidence which makes it almost impossible to doubt that the atom of the chemists can no longer be looked upon as the smallest indivisible particle of matter, but is actually split up into very much smaller particles in certain well known physical processes. If this theory is firmly established it will revolutionize the 19th century views on chemical and electrical theory, which by their total failure to explain the phenomena of the recently discovered Reontgen rays and of electric discharge in rarified gases, had begun to prove themselves effete.

Faraday was the first to show that the quantity of a given metal deposited in an electrolytic cell was proportional to the quantity of electricity which passed through the solution. This quantity of metal is also proportional to the atomic weight of the metal divided be its valency, i. e., the number of chemical bonds set free by the decomposition of the molecule. In the form given to it by Helmholtz, Faraday's law states that the same quantity of electricity passing through an electrolyte either sets free or transfers to other combinations, always the same number of valencies. In his Faraday lecture delivered in London, in 1881, he made the following important induction from Faraday's law: Every single valency of an elementary or compound ion is charged with exactly the same quantity of positive or negative electricity which behaves as if it were an electric atom that cannot be further divided. This amounts to saying that every active chemical bond of a chemical element is associated with the same constant quantity of electricity.

Prof. J. J. Thomson has extended the theory of Helmholtz by the remarkable discovery that when the elementary electric charge, or "electric atom," is negative, it is always associated with a small constant mass of matter, very much smaller than the atom of the chemists. These small masses or "corpuscles" with electric charges actually exist separately from the chemical atoms in the cathode rays, and in other cases where negative electricity is discharged through rarified gases.

Prof. Thomson describes his remarkable hypothesis as follows: "I regard the atom as containing a large number of smaller bodies which I will call corpuscles; these corpuscles are equal to each other; the mass of a corpuscle is the mass of a negative ion in a gas at low pressure—i. e., about 2×10^{-26} of a gramme. In the normal atom this assemblage of corpuscles forms a system which is electrically neutral. Though the individual corpuscles behave like negative ions, yet when they are assembled in a neutral atom the negative effect is balanced by something which causes the space through which the corpuscles are spread to act as if it had a charge of positive electricity equal in amount to the sum of the negative charges on the corpuscles. Electrification of a gas I regard as due to splitting up of some of the atoms of the gas, resulting in the detachment of a corpuscle from some of the atoms. The detached corpuscles behave like negative ions, each carrying a constant negative charge, which we shall call for brevity the unit charge; while the part of the atom left behind behaves like a positive ion with the unit positive charge and a mass large compared with that of the negative ion. On this view electrification essentially involves the splitting up of the atom, a part of the mass of the atom getting free and becoming detached from the original atom."

This remarkable theory will modify our ways of looking at many electrical phenomena. In electrolysis, for instance, when the anions and cations are liberated against the electrodes, the ions with the positive charge are minus the negative corpuscle and are neutralised by a corpuscle moving from the electrode to the ion, while the ions with the negative charge are neutralised by a corpuscle passing from the ion to the electrode. The corpuscles according to this view are the vehicles by which negative electricity is carried from one atom to another. It would appear that there is only one kind of electricity, namely, negative; positive electricity being due to the atom being short of negative corpuscles.

The effect of solution upon an electrolyte is, according to Arrhenius, to dissociate the molecules, *i. e.*, the chemical bond which unites the two atoms forming the molecule is torn asunder. This chemical bond, according to the theory we are now considering, is the negatively charged corpuscle. This bond, for some reason not understood, adheres to the electro-negative atom, and leaves a corresponding empty space in the electro-positive atom. This circumstance makes the chlorine negative and the hgdrogen positive. The negative electric charge on the cathode means an accumulation of electric corpuscles on its surface, while the positive charge on the anode means an accumulation of corpuscle cavities near its surface. The result is, that hydrogen is attracted to the cathode, and chlorine to the anode, but the transference of electricity is due to the passage of the corpuscles from atom to atom throughout the electrolyte. Conduction in metallic conductors probably takes place in the same way, but as the corpuscle has no greater attraction for one set of atoms more than another, there is no transference of the normal atoms along the conductors. In dielectrics, something prevents the corpuscles being transferred from one atom to another.

The number of corpuscles which can be detached from an atom by any known process is never greater than its valency or the number of its chemical bonds. It does not, however, follow that the part left behind does not contain more corpuscles which might be detached by more powerful means. The Zeeman effect, in which the lines of the spectrum are split up by the action of a magnetic field on the luminous substance, is explained by assuming that rotating particles of the substance, having an electric charge, are accelerated or retarded by the force exerted on these charged particles by the magnetic field. The ratio of the mass to the charge as determined by this effect is of the same order as that which has been deduced for the corpuscles, and hence the vibrating particles which produce the lines of the spectrum are probably the corpuscles of the atom. This view is further confirmed by the fact that the explanation of the Zeeman effect requires that the particles be negatively electrified. Now there are a considerable number of lines in the spectrum which show the Zeeman effect, and the presumption is that there are a consideraably number of corpuscles in the atom of the substance giving this effect

The ingenious experiments by which Prof. Thomson proves the existence of negatively charged corpuscles with mass very much smaller than that of the smallest chemical atom, will be found fully described in his paper in the Philosophical Magazine We propose here merely to briefly describe the nature of these experiments. Prof. Thomson had previously determined (Phil. Mag , October, 1897) the value of the ratio of the mass, *m*, of the ion to its charge, *e*, in the case of the stream of negative electrification which constitutes the cathode rays. The results of this determination which were confirmed by subsequent determinations by Lenard and Kaufmann, showed that the value of this ratio was very much less than that of the corresponding ratio in the electrolysis of solutions of acids and salts, and that it was independent of the nature of the gas through which the discharge passed and of the nature of the electrodes. Of course, the smaller value of $m\ e$ in the cathode rays might be due either to the mass of the particles being smaller, or to the electric charge on each being greater.

As it did not appear feasible to determine *m* or *e* separately in the case of cathode rays, experiments were made on a similar phenomenon, namely, the discharge of negative electricity from a metal plate under the influence of ultra-violet light. Elster and Geitel have shown that the rate of escape of negative electrification at low pressures is much diminished by a magnetic field when the lines of magnetic force are at right angles to the lines of electric force. In this case a negatively electrified particle detached from an electrified plate by the action of ultra-violet light, is acted upon by two forces, namely, the electric force normal to the surface of the plate, and an electro-magnetic force which is always normal to the direction in which the particle is moving. The effect of the magnetic field is to cause the particle to follow a curved path, like a projectile, and come back to the surface of the plate from which it started. The path is not, as in the case of the projectile, a parabola, but a cycloid.

After the gas in a tube has been dissociated by an electrical discharge, a negatively electrified luminous ring rotating round the lines of force is produced by a varying magnetic field. The negative corpuscles being of much smaller mass than the postive ions, are much more easily set in motion by the electro-magnetic forces; hence negative electrification of the ring.

The electrification of air by the splashing of drops of water which has been so thoroughly invested by Lenard may find its explanation in this theory. The negative corpuscle attached to the atoms of oxygen is probably separated from the atom by the solution of the air in water, so that the mere mechanical shattering of the drop is sufficient to set free the corpuscle with its negative charge. The electrification developed in this way is always negative unless a certain percentage of salts is dissolved in the water, when the electrification is positive. Evidently in the latter case some of the atoms of these salts retain the negative corpuscle and set free its positive atomic partner. The whole obscure question of the origin of atmospheric electricity will probably receive considerable elucidation from the electric corpuscle theory.

The evidence on which Thomson's theory is founded is so strong that it will be hard to upset; and if it stands, there can be little doubt that it is the beginning of a new era in chemistry and molecular physics.

Polonium Rays.—S. CURIE.—An account of an investigation of the penetrative power of Polonium rays. With Roentgen rays the absorption weeds out all but the rays of greatest penetrative power, but with Polonium rays it is just the contrary. Polonium rays do not penetrate the air at ordinary pressures farther than about 1½ inches, or about the same distance as Leonard rays; those radium rays which are not deflected by a magnet behave exactly like polonium rays. It is difficult to discover any law, of absorption in radium rays by themselves, as they consist of two species of rays obeying different laws of absorption. It is possible that these different laws indicate a fundamental difference in the nature of the deflected and undeflected rays.—*Comptes Rendus*, Jan. 8; abstracted in Lond. *Elec.*, Feb. 23.

THE ROENTGEN RAYS WITH ASSOCIATED PHENOMENA AND THEIR APPLICATION IN DENTISTRY.

The above is the title of a paper recently read before the Ohio State Dental Society. by W. A. Price, D. D. S., of Cleveland. The doctor says :

"If we are to use Roentgen rays successfully, and intelligently, we must familiarize ourselves as much as possible with the nature and characteristics of this wonderful force. This knowledge is not only desirable but imperative. We can best do this by comparison with other similar forces with which we are familiar. Let us look for an analogy; some similar imperceptible transference of force or energy. You hear my voice, how ? Sound is conveyed by a succession of waves. The pitch or tone is dependent on the rate. Let us recollect in passing that the sense of hearing makes us conscious of all vibrations in the atmosphere from sixteen per second to thirty two thousand. But this energy requires an easily detected medium to travel upon. It cannot come to us through a vacuum.

Another of our senses receives energy which we call light. This may vary in color. Again we are receiving vibrations of varying rapidity and the rate gives us the particular color. Note that this energy passes easily through a vacuum. We call them light waves.

Still another sense receives impressions without any trace of the medium that brings it, namely, sensation of temperature as we feel heat, and cold or the absence of heat. This energy we know as heat waves, and it also passes through a vacuum.

So also a mysterious energy entirely imperceptible in itself, enters chemical compounds and entirely changes them. For example, bromide of silver in the photographic plate. This force we know as actinic waves. Equally mysterious and imperceptible is the force that moves the magnetic needle or marshals the iron filing; magnetic waves. All the latter pass through substance and through great space, even trillions and trillions of miles without an atmosphere or an apparent conductor. We cannot imagine effect without cause, nor can we imagine energy being conveyed without something to convey it. Heat and light, and magnetism coming from the sun or a distant star, must have a means for passage.

This medium, according to modern science, is the everywhere existing ether. It extends throughout all space between all planets, penetrating and prevading amongst the atoms and molecules of all substances, as the air does through a car load of pumpkins. If we follow up this line of thought just a litte farther we will get a very comprehensive idea of what Roentgen rays probably are. When your ear receives two hundred and fifty-six vibrations per second, you recognize the tone of the middle C of the musical scale. And just so with every definite rate of vibration you receive definite impressions.

Just as the different sounds are the result of definite vibrations in the atmosphere just so are magnetism, heat, light, color, photographic or photo-chemical effect and x-rays the results of definite vibrations or waves in the ether. Imagine waves in the ether having about such a motion and curve as the surface of water in a rolling sea. You can easily imagine various waves of the same shape flowing at the same rate but of greater or of lesser dimensions. These various ether waves flow at a quite uniform rate, viz., approximating one hundred and ninety-two thousand miles per second, (Tyndall) though for each effect we call magnetism, heat, light, color, photo-chemical action, etc., there are different, though definite, length of waves, and hence numbers of waves per second. The variety is enormous; from waves over a million miles long for a complete oscillation, as the magnetic waves from the sun. (Oliver Lodge) which require six and a half seconds for a complete oscillation, to waves one twenty millionth of an inch long, (Veller) making two hundred and eighty eight thousand trillion vibrations each second. (Veller's calculations for x-ray.)

Intermediate between these we are able to recognize a large number of distinct waves' lengths, though relatively few considering the wide range. The sense of sight recognizes only a short series of wave lengths less than one octave, from one thirty-nine thousandth of an inch long, producing red light to one fifty-seven thousand five hundredth of an inch long producing violet light. Practically all the other waves that produce effect upon the human eye, have lengths between these two boundaries.

The lengths of the other waves determine entirely the color they produce by falling upon the retina of the eye. Time only permits of one example here. We will now have the professor at the lantern, place a prism in front of the light and you will see the distribution of the seven primary colors of the solar spectrum, or in this case the spectrum of the lantern light, though not so plainly as you would from an arc light. The relation of these light-producing waves to other ether waves is shown in this lantern slide (Fig. 1). Without explanation we note that other waves of various lengths each has a different angle of refraction in passing through this prism and in this way we are able to separate and select them. This is true also of those waves on each side of the visible spectrum. Kindly note that all the waves longer than the infra-red or shorter than the ultraviolet do not appeal to the sense of vision, and to do so must have their wave lengths or periods changed to come between those limits. This we do with the Roentgen rays by means of the fluoroscope. The wave lengths are changed in the crystals, which we will explain shortly.

To better understand the nature of the Roentgen rays we will observe quickly some characteristics of some waves of other lengths. In the lower part of the visible spectrum and extending down through four octaves of wave lengths we have the heat waves. One simple experiment will suffice. I pass the waves from this arc light through this filter made of carbon bi-sulphide holding iodine crystals in solution and remove all the light rays and then condense the remaining rays with this lense, and I am able to set this paper on fire or heat this platinum to a white heat. The relation of the light rays to the heat-producing rays can best be appreciated by this lantern view (Fig. 2) showing the relation of the heat rays to the light rays from the sun after passing through the moisture of the atmosphere and this slide (Fig. 3) the relation of the heat rays of an electric arc to the light rays. In each the dark part from A to D C indicates the relation of the heat waves and their intensity below the visible spectrum and C D to E shown clear the spectrum from red to blue, and the heat waves therefrom, the line A B E indicating the intensity. You will observe that fully eight times as much of the energy of the arc light is given off in heat rays as in light rays. In the next (Fig. 4) we see the relation of many wave forms to each other and to sound waves.

The waves of longer period or length do not appeal directly to any of our senses but we know that they exist from their effects. Marconi and others have invented eyes, to see as it were, some of these waves of ether lengths. That is the function of the receiver or co bearer used in wireless telegraphy. I have here arranged a working model. When I set these brass balls of this induction coil about an eighth of an inch apart and cause a spark to jump across, it is probable that the vibrations produced in the surrounding ether are at the rate of about sixty million per second the waves being possibly a few miles from crest to crest. The wave length used is not known. You notice that as soon as I produce waves of this certain period this co-hearer receives them and closes the circuit of this battery which I have arranged by means of a relay to ring a bell. To show you how little effect distance has I will have someone carry it away through the building behind walls, etc. The model worked splendidly, so far as taken, responding each time the coil was excited, by this means Marconi has signalled ninety miles.

In a similar way wireless telegraphing, or signalling, is done at a great distance by waves of still greater length, magnetic waves, which we have not time to consider.

Ether waves of very short length, extending away above the visible spectrum into tbe so called ultra-violet rays, including the Roentgen Rays, have the power of producing extensive chemical changes. Chief of these are the actinnic rays so important in photography. You will see when I put this bottle of bisulphate of quinine in the ultra-violet part of the spectrum it glows. It is due to this power that we are able to use the Roentgen Rays. We allow these invisible rays to penetrate the tissues to be examined and some of the rays are arrested or stopped according to the obstruction offered by the different parts of the field through which they pass. thus producing unequal chemical action on the plate. Hence the term shadowgraph. This hypothesis of ether waves of extreme frequency explains very clearly and plainly, practically all the phenomena of Roentgen Rays. There is another theory, that of material particles being thrown off by the anti-cathode which pass through the glass of the tube unobstructed. This theory is not so generally accepted. Its chief supporters, however, are Americans.

The doctor further in his paper discusses the various methods used to generate the currents and the tubes from which he obtains the best light. The paper is concluded with radiographs, which will be followed in our October issue, with descriptions.

BOOK REVIEWS.

FRACTURES, by CARL BECK, M. D., Visiting Surgeon to St Mark's Hospital and to the New York German Poliklinik; formerly Professor of Surgery, New York School of Clinical Medicine; Consulting Surgeon, Sheltering Guardian Society, Orphan Asylum, etc., with an appendix on the practical use of the Roentgen rays 178 illustrations. Price, $3.50 net. W. B. Saunders, Publishers, 925 Walnut street, Philadelphia.

The only words on the cover of this book are: "Fractures" "Beck." This rare simplicity upon a book cover invites an interview.

The paper is heavy and coated throughout, a selection unique in book making, a practice that must be followed in medical works to accommodato the new science. The frontispiece is a radiogram of a patient's feet and legs taken for comparison showing one fractured and the other intact. Subjoined is a brief history thereof. This introductory picture is a radical change from the time-worn pictures of fathers and authors. The book is dedicated to Roentgen "without whose discovery much of this book could not have been written."

In his preface Dr. Beck has had an exceptional opportunity to give cogent reasons for writing a book. It is the first systemic treatise ever written for the student and practitioner wherein portraits of internal organs are made of the living. The anatomic findings have been verified by exposing the fractures in their living state The author says "The illustrations in older works were mainly made from the cadaver. The splendid schematic representations that resulted were not portraits from life. The minute arrangement and disarrangement of fragments of splinters, especially in their relation to the joints were necessarily disarranged by even the most careful dissection. The Roentgen rays depicts these details and all others undisturbed as they are in life. It is with these that the surgeon has to desl.

In the introduction Dr Beck touches upon the physics of the science and then plunges into the diagnostic advantage of the rays in various types of fractures.

One of the traits of the book is simplicity and freedom from verbosity. There is no figurative language except an occasional simile used for emphasis. When s technical phrase is used it is immediately followed with parentheticsl explanation When a description is of the plain tongue technical parentheticsl clauses follows. It is thus that the book becomes easy to read, essy to understand and the best possible mode for imparting education It is a rest to be able to read a book on fractures so free from complicating phrsses.

The general plan of the book is in two parts and an appendix. Part one covers Fractures in General, and includes Classification of Fractures. Statistics, Signs, Diagnosis, The Process of Repair, and the Formation of Callus, Disturbance in the Process of Repair. Treatment, Peculiarities of Fractures in Children. Part Two—Fractures of Special Regions. Fracture of the Shoulder and Upper Extremity—Clavicle, Scapula, Humerus, Forearm. Hand and Fingers. Fracture of the Pelvis, and the Lower Extremity—Pelvis, Thigh, Patella, Leg, Foot. Fracture of the Bones of the Trunk—Ribs, Sternum, Spinsl Column. Fracture of the Skull—Vertex, Base, Facial Bones.

The appendix. The Practical Use of Roentgen Rays. Errors of Skiography, Index.

The skiagraphs are exceedingly good, reduced as they are in some instances many diameters. They are distinctive for teaching. In making up the 178 illustrations nearly half of them represent the style of fractures as seen in ordinary text books by unaided means. Immediately beside each of these is a skiagraph of the same subject viewed in the same plane showing the anatomic condition in a "living picture." These side by side pictures act as a revelation to guide the careful doctor in his trying mission.

Dr. Beck has written the first book ever written upon the subject of fractures, in which is portrayed the abnormal condition of the surface of the patient overlying the fracture together with the abnormal condition of the bone as it actually is when brought to the surgeon. False, doubtful and ambiguous teaching the result of former guessing will be replaced with confidence and accuracy by those who will read this book. All other works on the subject of fractures may be laid aside as relics of obselete literature. Dr. Carl Beck has in one stretch encompassed the field and given us light in the midst of darkness.

Skiagraphic Atlas.

Showing the Development of the Bones of the wrist and hand, for the use of students and others by John Poland, F. R. C. S. Published by Smith, Elder & Co., 15 Waterloo Place, London, Eng. Price $1.25.

This book contains nineteen radiographs of hands and wrists all of which are actual reproductions and of normal size. They represent ages ranging from twelve months to seventeen years. These radiographs are interesting because they show ossification of the bones of the wrists and hands at different periods of infancy and adolescence. An explanatory page accompanies each picture. The first begins with: "*Lower end of ulna.*—There are no traces of calcareous material yet visible in the cartilaginous lower epephysis, while the diaphysis is rounded, slightly curved with convexity inwards, and its end is flat and almost exactly on a level with that of the diaphysis of the radius." Then follows description of lower end of radius, carpus, metacarpal bone of thumb, four inner metacarpal bones, phalanges of fingers first row, middle or second row, unequal or terminal phalanges. This same completeness of study obtains through all the radiographs up to the seventeenth year, when the bones seem fully formed.

This contribution to the study of anatomy is unique, most valuable, and must establish a new text for the student and practitioner. It is an invaluable guide to the doctor who treats fractures and joint injuries, who must know the normal conditions before be can hope to recognize abnormal ones. The book is well bound, well printed, and the half-tones are on heavy coated paper.

Biography of X-Ray Literature and Research.

By Charles E. S. Phillips. The Electrician Printing and Publishing Co., Ltd., 1, 2, and 3 Salisbury Court, Fleet St., London, Eng.

This little book has about 100 pages in all. The frontispiece is a cluster of well-known faces of some of the x-ray workers—Roentgen, Crookes, Lenard, Lodge, Righi, Elihu Thomson, J. J. Thomson, S. P. Thompson.

Very properly the book opens with a retrospect or brief historical sketch of the x-ray advance done by Guericke, Mollet, Faraday, Geissler, Maxwell, Masson, Sir W. Thomson, Gassiot, Sprengel, Hittorf, Goldstein, Warren de la Rue, Hugo Muller, Spottismoode, Croakes, Wiedemann, J. J. Thompson, Hertz, Lenard, Perrin, Elster, Geitel, Roentgen or the history of the works of these physisists who paved the way for the final discovery of the x-rays.

The title and price of all books devoted to x-ray science and also all titles of important papers are given in alphabetic order. The little book is well and handsolmey bound.

Food Theory of Medicine.

Walter Emery Merrill, M. D., U. S. Marine Hospital Service, says: "Among the advanced members of our profession, I believe the drug tissue—feeding theory no longer obtains. And rightly so, for it has not been proved that medicine is ever, *in itself*, a food. The large number of malarial cases emanating from the tropics are cured in the Marine Hospital service, not by tissue-feeding, but by ridding the system of the intruder and directing the vital forces along the lines of repair. This I find to be best done by the frequent and judicious administration of laxative antikamnia and quinine tablets."

THE AMERICAN
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VOL. 7. ST. LOUIS, OCTOBER, 1900. NO. 4.

CONTENTS VOL. 7 NO. 3.

Excitation of the Crooke's Tube by the Static Machine. Chapter VIII, by Dr. J. T. Pitkin.

Therapy of Encephalocele.

The Pathology of Fracture of the Lower Extremity of the Radius.

Missouri School for the Blind.

Negatives Developed in Light.

Discontinuity of Cathode Radiation.

Home Made Static Machine.

Answers to Inquiries.

The Downfall of the Atomic Theory.

The Roentgen Rays with Associated Phenomena and their Application in Dentistry.

Book Reviews.

CONTENTS VOL. 7 NO. 4.

Roentgen Society of the United States. By Dr. J. Rudis-Jicinsky.

One of the Active Rooms in the Laboratory of Nikola Tesla (Illustrated.)

Excitation of the Crooke's Tube by the Static Machine. (Hysteresis.) By Dr. John T. Pitkin.

Answers to Inquiries.

Gunstock Deformity.

X-Ray as an Irritant. By Dr. Mihran K. Kassabian.

Bright Green Patches.

Lost Needles.

Ankylosed Knee.

Spectrum of Radium.

Ionic Conductivity of the Atmosphere.

Absorption and Ionisation.

Roentgen Rays.

Static Cataphoresis.

DR. MIHRAN K. KASSABIAN,
Philadelphia, Pa.

The American X-Ray Journal.

Devoted to Practical X-Ray Work and Allied Arts and Sciences.

VOL. 7. *ST. LOUIS, OCTOBER, 1900.* *NO. 4.*

ROENTGEN SOCIETY OF THE UNITED STATES.

The preliminary announcement of the meeting of the Roentgen Society of the United States, at the Academy of Medicine, New York City, December 13th and 14th, 1900, was sent out to the professions, medical, electrical and dental press, with the laudable purpose of increasing the membership of the association, enlarging the circulation of the JOURNAL, the official organ of the society, and promotion of the new science with all the members of the society. Each member, we hope, may secure an acceptable applicant for the society, having our plans of work, the copy of our constitution, blanks, etc., at hand. We are sure that every member of the society feels an interest in its growth, and we desire to impress the fact on all that a little effort on the part of each one, will soon see its members doubled, and its influence with possibility of good enlarged.

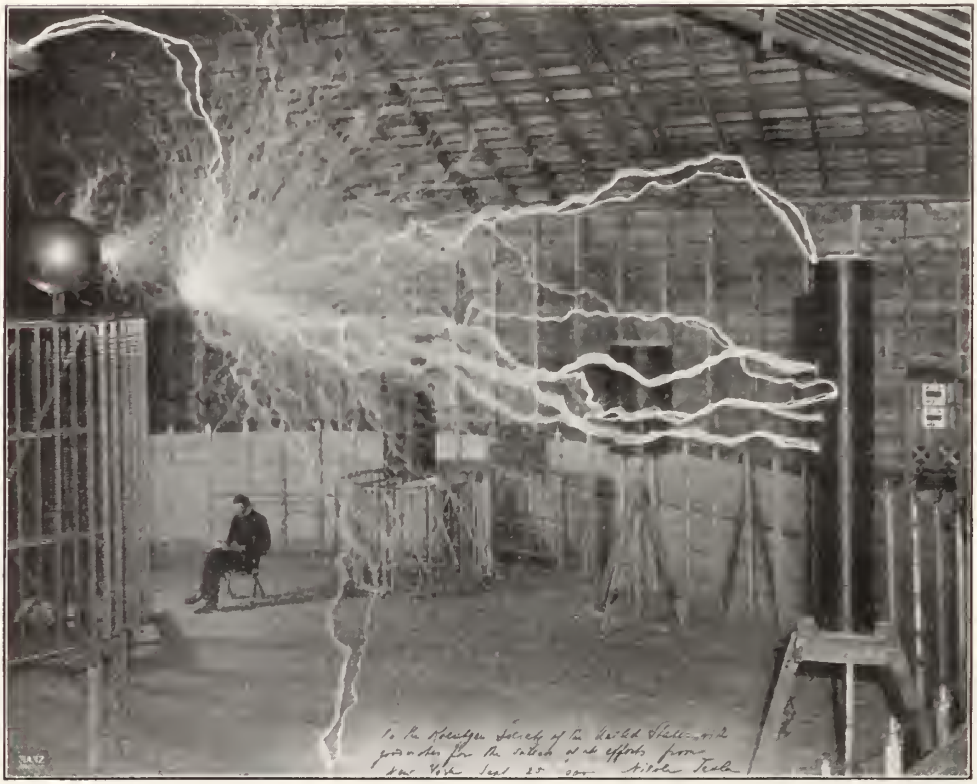
The AMERICAN X-RAY JOURNAL is the only one of its kind in the country, has the largest reading circulation of any medical journal in St. Louis, Mo., contains more original reading matter, more news in electrology and radiology than all others together, covering practically the whole field of current literature on the x-ray from the whole world. The proceedings of our meeting will be published in the JOURNAL and we can promise you now already a literature, on the uuknown ray, which can not be gotten on every occasion. Dr. S. H. Monell, New York, N. Y. Chairman of the Committee on Arrangement, has full charge of the work in New York, and all those who wish to participate in the exhibit may communicate with him, and also those who intend to exhibit their own radiographs of actual cases, etc.

Our society was organized for scientific and practical purpose, for mutual advantage and defence, and if necessary offense.

We wish to enroll the entire professions, all the honest workers in the x-ray field under our banner. It appears we cannot do so and be in affiliation with other regular, especially medical societies. But to succeed in one object we must go it alone since we are purely a scientific and practical society we can do so, without any action against the code. We are after the quacks, in an out of the professions. We are after the fellows who misrepresent the useful x ray and do work not honest in its purpose. We want to watch them, watch their work and educate the public to be on guard. But we also want to keep out of our society the howling "expert" and doctor who may be armed with a certificate from the Board State Medical Examiners, giving him the right to practice in our States, and who will get up in our midst, advertise "to heal and diagnose all the chronic diseases," with his second-hand medicine, called the x-ray apparatus. How are we going to do all these things? Very simple, through our national organization, mutual help and support of proper legislation in all the States of the Union, and education of the people, for their benefit and the benefit of ourselves, through the press and schools and later on, perhaps, with the help of free popular literature.

For complete information regarding our society, send for the preliminary announcement to the secretary, Cedar Rapids, Iowa; for particulars in regard to the exhibit at our December meeting and actual demonstrations, etc.; write to the Chairman of the Committee on Arrangements, Dr. S. H. Monell, The New York School of Special Electro-Therapeutics, No. 17 West 27th street, New York, N. Y.

J. RUDIS-JICINSKY, Secy. and Treas.



To the Roentgen Society of the United States with
good wishes for the success of its efforts from
New York Sept 25 '00 Nikola Tesla

ONE OF THE ACTIVE ROOMS IN THE LABORATORY OF NIKOLA TESLA.

EXCITATION OF THE CROOKE'S TUBE BY THE STATIC MACHINE.

Hysteresis.

By John T. Pitkin, M. D.

Chapter IX.

When a metallic conductor is excited by a battery, a dynamo or a static machine, the conductor is electrified, the surrounding medium magnetised, the temperature of the electric and dielectric elevated, and the molecular mechanical activity intensified. So constant is the correlation of these allied forces, that the amount of any one of them may be employed as the measure of the others. Thus electricity may be measured by the strength of the magnetic field, the degree of latent heat released, or the acceleration of mechanical action with which it is accompanied, the capacity of the conductor being duly considered.

If the current is unidirectional and of invariable strength, the degree of heat evolved may be expressed by the following eqnation

$$\frac{E.\ M.\ F.}{C} = H$$

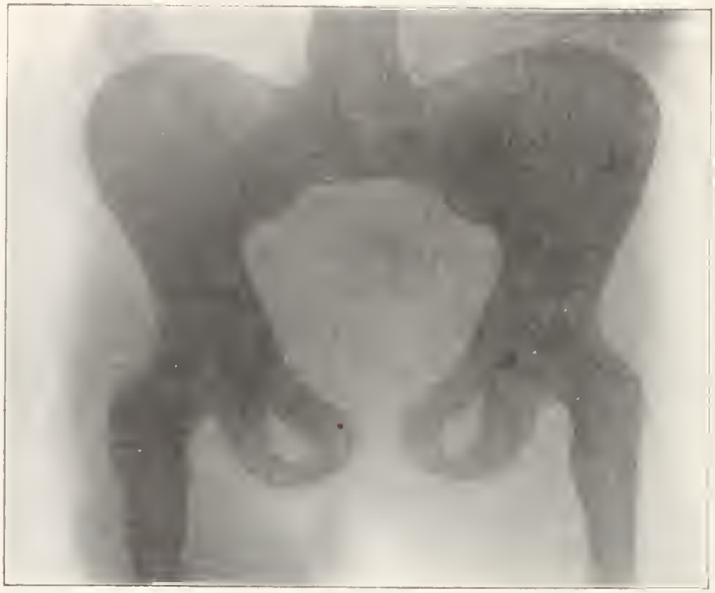
in which E. M. F. represents the pressure or voltage C the strength of current and H the calorific effect. The heat evolved corresponds to the work required to overcome certain preexisting molecular forces, which are constantly operating to restore the conductor to the condition which existed prior to electrification. The rise in temperature also corresponds to the Ohmic resistance i. e.

$$\frac{E.\ M.\ F.}{C} = R$$

Again, it is related to the second power of the current, and is technically known as the Joule effect.

Such a current generated by a sixteen or twenty, thirty-two inch, revolving plate static machine, passed through a Crooke's tube suited to the apparatus, will heat the target to redness, and the glass bulb become slightly warm to the touch, caused by the Joule effect and the impact of molecules against the reflector (the bulb will be a little warmer than elsewhere at the anodal extremity) but the target or electrodes will not fuse or become contorted, the glass bulb will not be cracked, punctured or otherwise disabled, even if the excitation is continued indefinitely. Should one or more spark gaps be placed in the circuit, the current will be rendered undulatory, and disruptive in character. The molecules of which, the electrical conductors, electrocs and reflector and the dielectric glass globe are composed, are alternately subjected to the coercive force of electro-magnetism and the preexisting forces, the former at the make the latter at the break of the circuit. The amount of heat evolved will correspond to the energy employed in making the interchanges. The temperature of the Crooke's tube placed in simple series will rise rapidly, and if of the American static type and the excitation is prolonged, the target is likely to be melted at its central focus, giving it the appearance as if a small round nail had been driven from the anodal towards the cathodal side, leaving the edges ragged, frayed and projecting from the latter surface. The glass bulb is heated so as to be uncomfortable to handle but as the volumn of current and x-radiance are augmented the definition or clearness of the image upon the fluorescent screen or photographic plate will be proportionately intensified. This effect increases with the length of spark gap, providing the generator is able to maintain the current without short-circuiting.

When shorter spark gaps become necessary, or when less voltage and more volumn is desired to excite a given tube, Leyden jars may be employed as static transformers in the following manner. Place the jars upon large glass plates, connect their outer coatings with each other by a metallic rod or wire, and leave the sparking gaps in the circuit as before. Observe that the picture is clearer than it was before the condensers were used, and that the clearness increases with the size of the jars and the length of spark gap employed until the jars are seen to blaze with each pulsation, then the machine and condensers will discharge in step and one becomes a measure of the others capacity. It follows that the greater the primary generating power of a given apparatus the more frequent will be the pulsations with a given set of condensers and the shorter the sparking gap required to obtain synchronous action. As the vacuum in the Crooke's tube rises from use, sparking gap can be shortened because the resisting tube has supplied an equivalent in restraining action upon the current, requiring that the visa tergo shall gain volumn and momentum before it can overcome the barrier.



BULLET LODGED IN BONY PELVIS, NEAR HEAD OF FEMUR—Excited by Holtz Machine having hard rubber collars between the revolving plates.

The remarks upon clearness of definition do not refer to the deep shadows more or less blurred, produced by an under excited tube or similar effects obtained on the confines of an average x-ray field, but the clearness of detail, showing the elevations and depressions, the compact and cancellous tissue of bone, less distinctly, the muscular, adipose and cutaneous tissues, the heart, liver, and other dense solid structures. Effects which can only be obtained with high tension currents of considerable volumn. The undulatory current can be employed to advantage when the static machine is meagre in electrical output, when the tube is soft, of low vacuum, when the parts to be examined are very dense, or have considerable thickness, providing the tube is allowed time to cool at stated intervals. The strong German or the best American coil tubes can be used with less danger of being incapacitated than those of the delicate American static pattern.

For the purpose of comparing the calorific effect upon the Crooke's tube of a current from a sixteen plate static machine with a high tension induction current, of the same strength and voltage, the primary of a suitable Rhumkorff's coil was placed on a commercial sinusoidal current. Its secondary supplied the primary of a Tesla coil, the secondary of which in turn contained the American static tube to be tested. Under such an excitation the cyclic changes in the current from negative to positive, and from positive to negative must take place in the structures of the tube and the heat evolved be a maximum. After allowing the apparatus to operate five minutes, the electrodes and target became softened and contorted, the glass bulb too hot to handle. Upon being allowed to cool a crackling sound was heard. The current was then turned on a second time when a purple brush discharge was seen playing through its centre

BUFFALO N. Y.

ANSWERS TO INQUIRIES.

P. B.—The AMERICAN X RAY JOURNAL has two volumes in each year. Complete index for the first four volumes was printed in volume 4, No. 6. Volume 7, No. 6, will contain index of volumes 5, 6 and 7. Those who intend to bind their journals should wait for the December issue.

C. H. W.—X-ray light I believe to be sufficient to give visible impressions of arteries, veins, muscles, etc., but with the exception of faint outlines we have thus far failed to obtain practical views. I have seen the femoral artery in a negative and the aorta has been traced in the fluoroscope. The fault possibly contributes in three ways; the material of which the screen or film is composed, inability to interpret shadows and lack of anatomical knowledge. It may be possible for a plate or screen to be composed of an agent that in each case will have selective action upon artery, tendon or muscle. It is thinkable because of the varying constituents of these parts. This may be combined in the same radio-active agent. Absorbability of the x-rays by all the soft tissues of the body are slightly contrasted in the same plane. When overlying each other this contrast lessens on account of fisrt, increased density which absorbs the rays and second, distortion of the shadows caused by position. Closer study has given us readings of plates that were not recognized one year ago.

J. H. M.—Stereoskiagraphy refers to two radiographs taken 2½ inches apart, of the same object—this being the distance from centre to centre of the two eyes, and after photographically reduced viewed through a stereoscope. Looking at pictures in the stereoscope thev appear as if seen in relief or as solid objects, because the instrument gives to each eye its proper picture and the brain blends the two pictures into one.

T. B.—THE AMERICAN X-RAY JOURNAL is the parent x-ray journal of the world. It was the first journal in any language devoted to this science and appeared on the first of May, 1897. England, Germany, France and Spain have each followed with such a publication.

S. H.—Fractures, by Dr. Carl Beck is the best book for students and practitioners. In fact this is the only book up-to-date on the subject of fractures. Here can be found not only the most definite language clearing up ambiguity, but in addition the photographic and radiographic illustrations of cases brings to light those valuable points so much sought, but never before found. The book is $3.50 and published by W. B. Saunders, Philadelphia.

Gunstock Deformity.

Cubitus varus or gunstock deformity is carefully studied in its radiographic aspect by Dr. Lewis A. Stinson of New York, in the Annals of Surgery for September. Supra-condyloid fractures are most difficult to diagnose and at no time is a surgeon justified in consigning his patient to a permanent dressing until the condition has been determined by radioscopy. We commend this article in the Annals of Surgery to all practitioners.

X-RAY AS AN IRRITANT.

By Mihran K. Kessabian,
Skiagrapher to the Medico-Chirurgical College and Hospital.

In the August issue of the American X-Ray Journal, Dr. J. N. Scott, Kansas City, calls the attention of the profession to the subject of "X-Ray Burns" and invited discussion.

It would be a difficult matter for me to enter into the discussion, considering the little experience I have had with the matter of so-called "X-Ray Burns."

The discovery of the x-ray being quite recent, and also having been often manipulated by inexperienced persons, the mistakes and ill effects have been exaggerated by old-fashioned surgeons who do not believe in asepsis and antisepsis and germ theories and who depends solely upon his blind tactile sense, while his vision is available.

Many surgeons claim that they can detect all abnormalities by their old methods, but when they are puzzled in cases of peculiar fractures, foreign bodies, etc., they resort to the use of the x-ray with a humiliated spirit; but to-day very many prominent and skillful surgeons and physicians admit the usefulness of x rays in medical and surgical cases. Have you any method of operation which is entirely free from danger? or, any specific or "sure cure" remedy for disease? Any method of treatment which is free from mistakes and errors? Why should slight *errors* and *distortions*, or burns be therefore a great stumbling block?

I have been interested in x-rays from the beginning of its discovery, and since then I have examined more than 3,000 medical and surgical cases (besides experimenting on animals) and have made more than 800 negatives in the hospital and also in the U. S. Government service during the American-Spanish War (1898–99).

I have read about x-ray accidents (burns) and many physicians and patients have warned me, when I started to make x-ray pictures. I laughed at them and did not believe that such a thing existed, but nevertheless, I was very careful; every caution being taken to avoid such accidents.

About six months ago I was making some experiments with the x-rays in cases of ophthalmological operations for example, Mule's operation, in which the contents of the eyeballs are removed, and replaced by glass (gold) balls and sometimes artificial eyes.

Case 1st.—A young girl, 21 years of age, on whom the above operation had been performed, and (who had been blind from infancy) was submitted to x-rays in order to see the position of glass balls in orbital cavities.

A plate (6½ x 8½) was fastened to the left temporal region, the distance of tube was 15 inches from the nearest side of the face, exposure 2 minutes (high vacuum). As the patient moved a second plate was exposed. Second plate was spotted, so a third one was made which was perfectly good. The three exposures lasting 30 minutes on the same day.

Two weeks after, according to her story, she noticed that the hair on her right temporal region, which had been nearest to the tube, was falling off.

I saw her in the Hospital the third week after the x-ray photograph was taken, and her hair was brittle and could be pulled out easily. Under the microscope it did not show any pathological change.

Under proper treatment her hair returned to its original and normal condition. This was the *first* case that came under my personal observation.

A Second Case.—That of a young man who was an x-ray demonstrator, and who had charge of the manufacture of Crooke's tubes and coils. The dorsum of his left hand had the appearance of one who had circumscribed subcutaneous hemorrhages.

The *third case* is myself.

About five months ago the fingers, knuckles and dorsum of my left hand exhibited a general erythematous condition. This continued about a month; the itching became intense, the skin became tough, glossy, edematous and yellow.

On my right hand it was less marked, occurring only on the fingers. This I attributed to the fact that I hold the fluoroscope with this hand. I also put my left hand over the fluoroscope and expose it direct to the x-rays. (I used to show it to the patients before I began the application of the x-rays as this tends to prevent the patient's becoming emotional or excited.)

First I thought this condition was due to the chemical action of the developer (Metol) but it was not, evidently, because the discoloration appeared first on the left hand and along the wrist, which is mostly exposed to the rays and less to the developing process; if it had been due to the developer, the right hand would have been affected first and most. And again this is not probable because I have been wearing rubber gloves while developing the negatives. This leads me to believe that the changes taking place in the *tissues* after *exposure* to the *rays*, are due to their *chemical* (?) action on the tissues. I will discuss briefly the following main points: (1.) *Name*. (2.) *Causes* (probable). (3) *Prevention* of the x-ray *injuries*.

The nomenclature of this effect or of the results following the abuse of the x-rays varies, and are very numerous according to the part affected and the degree.

"*Burn*" is not a proper word to use although it is employed by professional men as well as the laity. I wonder why the clothes of the patient are not burned? Why the patient only burns.

The definition of "Burn" according to the dictionaries are not applicable to the x-ray injuries. (Vide-Century, Webster, etc.) Dr. G. G. Hopkins in the *Philadelphia Medical Journal* of January termed this a "white gangrene." This term seems to be not a proper one, because the definition of "gangrene," according to the medical dictionaries and pathologists, is: "The total death of a part with putrefaction, etc." It also has been termed "*Dermatitis*" in cases where only the skin is affected. This is a better term than the word "Burn."

2. *Causes.*—The pendulum of opinions of causes is swinging in many directions, so that many observers of repute and knowledge cannot decide on any apparent cause as yet, as the rays themselves are still a mystery. My opinion is this: The chemical action of the x-rays will cause this disturbance in the tissues. We notice how the x-rays penetrates the body and oxidizes the silver and its different haloid salts in the emulsion of the photographic plate.

So the chemical part of the x-rays while penetrating the human tissue, some part of the rays are *absorbed* by the cells, or *oxidized*, or *precipitate* the organic or inorganic salts in the blood and tissue.

For the various causes of these injuries and their explanation the reader is requested to refer to the work of Dr. D. Walsh, of Edinburg, on "The Roentgen Rays in Medical Work" (1899), second edition, page 210.

I am of the opinion that idiocyncracies exist because many people are exposed to x-ray demonstration and but very few suffer ill consequences as compared to the administration of drugs and the susceptibilities of disease.

(3) To prevent these accidents I have used the following precautions in my practical x-ray work.

(a) *The Distance of the Focus Tube.*—By increasing the distance of the tube from the object, we get good sharp normal shadows of the part to be taken on the plate. It is the safest way to put the tube as far away as possible. I put the tube 3 feet high from the body in lung and hip cases; but in fluoroscopic examination the safest distances from the tube may be 6 to 8 inch with a duration of 2 to 3 minutes.

(b) *Time of Exposure* —This varies according to the degree of vacuum, the distance of the tube, thickness of the part to be taken, the sensitiveness of the plate, and whether through plaster of Paris or ordinary dressing. The shorter duration the less the danger.

We do not have as many accidents as we did have in the beginning of the discovery, because the length of exposure can be reduced to a couple of minutes and even to the seconds while formerly in many instances an hour was required. This is a very strong proof that the frequency of the occurrence of "injuries" is increased directly as the length of exposure. The better method is to develop skillfully and try to bring out the details, rather than prolong the exposure. If we can see the shadow of the bones on the fluoroscope, in a fraction of a second, it ought not to take more than a few seconds or fraction of minute to make impression on the photographic plate.

(c) *Frequency of Exposure.* — Short exposures, but frequent ones, are as bad as the long single exposures.

(d) The interposition of an aluminum sheet connected to the earth through the gas pipe or other like means of conduction, is a good method. This will, according to the absorption theory, absorb the chemical rays of the x-rays.

Covering the part with oiled-silk has practical value.

This merely is the outcome of my own experience with the Roentgen Ray. I leave the matter at this point to the consideration of the profession and, if necessary, for further discussion.

1808 Green Street, Philadelphia, Pa.

At a recent meeting of the Roentgen Society, London, Dr. R. Norris Wolfenden and Dr. W. F. Forbes-Ross presented a paper entitled, The Effects Produced in Culture of Micro-Organisms and of Tubercle Bacilli by Exposure to the Influence of an X-Ray Tube. Briefly, their investigations prove that the x-rays have no germicidal effect but on the contrary accelerate the growth of bacilli. No explanation is made for the curative effect of the x-rays, but editorially in the Archives of the Roentgen Rays it is suggested that necrosis of healthy tissue caused by raying may render the parts unsuitable for the growth of bacilli. Especially might this be true with lupus. But this can hardly be ascribed to the death of hair bulbs, to psoriasis, acne, scar tissue, etc. Further and more elaborate research is needed.

BRIGHT GREEN PATCHES.

The bright green patches that appear on the inner wall of the Crooke's tube while a discharge is passing, has been carefully considered by Mr. Chas. E. S. Phillips, in the London Electrical Review for September 21. All observers of the x-ray lamp have noticed small bright specks upon the surface of the cathode when an electric charge was entering. Mr. Phillips says that these bright points are due to the emission at that point of fine jets of gas which go out into the attenuated gas in a spiral form. It is from these points on the cathode that the green flecks originate. These jets of gas are actuated by an external magnet and the flecks upon the glass walls are shifted at will. When the bright specks on the cathode change, the flecks also change their position. The bright spots disappear to the vision during high exhaustion but the green flecks may remain. When the discharge through the bulb was stopped the flecks remain 10 seconds. A positively charged body brightened these spots but a negatively charged body extinguished the flecks immediately. This was so also when the electrodes were connected to the earth. These jets of gas assume the property of ionisation while crossing within the bulb and this is essential to the production of local fluorescence in the glass upon which they impinge. The experiments were performed with a pivoted disc of aluminum as the negative electrode. The external magnet could be used then to shift the electrode which was seen to move the spots also.

LOST NEEDLES.

Dr. N. S. Scott of Cleveland, Ohio, has a valuable illustrated article in the last quarter issue of the Bulletin of the Cleveland Genl. Hospital. In this article Dr. Scott very carefully shows how easy it is to miss the needle even with a good radiograph though it may be in an object thin as the hand. He gives advice as to the direction of the incision, insisting that it should be at right angles to the shaft of the needle. Caution is however given against the division of tendons and arteries. A radiograph is given of a needle in the thenar eminence which had been unsuccessfully cut for, and the incision having been made at right angles. The plate was before the surgeon and he could see the needle but he could not get it after more than an hours search. The incision was more than two inches long. A subsequent radiograph showed the incision to have been made over the needle. Failure to find it was attributed to the use of retractors displacing the needle to one side.

We are familiar with a case in which a linoleum nail ¾ of an inch long was lodged in the hand of a yonng women. The nail was located with the fluoroscope and the position determined with the fluorometer. Four indelible marks were made on the skin and instruction furnished the surgeon that the nail was at the intersection of the planes through these lines. The surgeon at his office made a bold and determined incision down to the nail and parallel to the shaft. The patient instantly jerked the hand and the search afterwards failed. The disgusted doctor gave up the hunt and other and more determined surgeons began. Under an anaesthesia the patient was subjected to two hours dissection with complete failure. The last operator had neither plate nor guiding lines. The blood had washed away the lines traced for the first operator and the plate was still in the developer. The dissection, according to reports, was made over and about the nail badly mutilating the hand. The nail was fixed beneath a sesamoid bone at the inner aspect of the carpo-metacarpal articulation of the thumb and parellel with the shaft. Under an aesthetic or without, with a trusted patient the first surgeon would have succeeded. He had the necessary data and the knowledge.

When a foreign body lays along the shaft or tendon the best known method for its removal is to first locate it with the fluoroscope and the fluorometer. Then make an incision down to the foreign body. As the cut is along the shaft you may fall to one or the other side. Do not subject the patient to any delayed search. With the fluoroscope relocate and at the same time place the scalpal in the wound and you will instantly see the relation the knife has to the foreign body. The slightest cut will now relieve all anxiety.

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DR. J. RUDIS-JICINSKY.

CEDAR RAPIDS, IOWA.

The Archives of the Roentgen Ray has changed from a quarterly to a bimonthly. The Roentgen Society, London, brought about this change.

Ankylosed Knee.

The Journal of Orificial Surgery for September, contains a radiograph of a knee that had been operated upon one year previous by Dr. E. H. Pratt of Chicago. The joint had been ankylosed 16 years and the patella was bound to the femur with hard bony matter. The joint was united with dense fibrinous bands. In the operation the knee pan was chiselled away from the thigh bone and the adhesions forcibly broken up. The radiograph shows the patella to be free from the femur and the patient is reported to have some use of the joint.

Spectrum of Radium.

It is said by Runge that three of Demarcay's lines are not contained in the solar spectrum. This is the result of redetermining the spectrum of radioactive barium chloride.

The continuation of the article by W. A. Price, D. D. S., "The Roentgen Rays with Associated Phenomena and their Application in Dentistry," will be concluded in the November issue of this journal.

Prof. James Wimshurst in the Archives of the Roentgen Ray has given the history of his life's work in developing the influence machine. The article is well illustrated.

Ionic Conductivity of the Atmosphere.

Elster and Geitel.—A paper in which they apply Lenard's discovery that ultra-violet light is capable of imparting conductivity to a non-conducting gas, in order to account for the dissipation of the charge of an electroscope by ordinary air. Since the sun's rays contain ultra-violet light before they impinge upon the atmosphere, this light must ionize the upper strata, and the ions produced will be gradually distributed through the whole of the atmosphere by diffusion and convection. Hence the air will contain stray ions of both signs, possibly differing in frequency with the altitude. It is these ions which gradually discharge a carefully insulated electroscope.—*Ann. der Physik*, No 7; abstracted in Lond. *Elec.*, July 27.

Absorbtion and Ionisation.

McLennan.—An account of experiments which prove the following law: When cathode rays of a given strength pass through gas, the number of ions produced per in 1cc depends only on the density of the gas, and is independent of its chemical composition. When cathode rays are absorbed to any extent, the number of the product positive and negative ions bears a constant ratio to the quantity of the rays absorbed.—*Proc. Roy. Soc Abst.*, July 9; abstracted in Lond. *Elec.*, July 27.

Roentgen Rays.

Winkelmann.—An account of an investigation of the effect which a spark-gap has upon the production of Roentgen rays at higher pressures of the gas. The maximum pressure, at which rays are produced, depends upon the length of the spark-gap, upon its position, upon the nature of the gas, and upon the dimensions of the tube. —Ann. der Physik, v. 2, p. 757; abstracted in Elek. Zeit., Sept. 6.—Electrical World, N.Y.

In reference to the newspaper report to the effect that Mr. Edison had invented a new machine for the generation of electricity directly from coal without the intervention of engine, boiler, or dynamo, with a prediction that it would revolutionise the world in electrical matters, Mr. Edison is reported by the New York Electrical World as saying: "It is a lie and a fake. There is not a word of truth in it from beginning to end." To be misrepresented is one of the privileges of scientific greatness.—Electrical Review, London.

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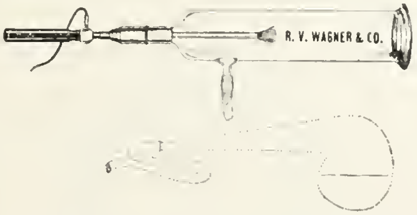
Static Cataphoresis.

Much attention is being given to the use of Static Electricity as developed by a Static Machine running at a high rate of speed. For many purposes the current thus developed is of special value and its latest application for the cataphoresis of gaseous substances, such as volatilized mercury, formaldehyde, oil of cinnamon, etc., has proven to be a most effective means of applying such remedies direct to the deceased tissues and is an ideal treatment for consumption, tubercular joints, glands or any local infection. Dr. R. V. Wagner has lately invented and perfected an instrument which makes the use of Static cataphoresis most convenient and will enable any one having a Static machine to avail themselves of this new and effective mode of treatment.



The instrument consists of a glass cylinder made to fit closely to the skin at one end, while the other is fitted with an adjustable discharge brush; the brush should be attached to the positive pole, while patient is in contact with the negative. The discharge of current passing from the brush to the patient through gases or medicated air (which may be admitted to the cylinder through an opening leading to a retort or other receptacle by rubber tubing) drives the substance in with much greater penetration and in a form more suitable than any other known means of cataphoresis.

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Skin Grafting.

By T. J. Biggs, M. D., Stamford, Conn.

Sam Coen, a German, aged 21, came September 20th, 1895, showing a surface 2 3 4 x 3 1-2 inches denuded of the fascia, in consequence of an injury received six months before. He had been treated at various institutions without result. The ulcer would partially heal, remain stationary for a week or ten days, and then break down and return to its original size. It had been skin-grafted, or rather, this had been attempted, twice, but in both cases all the grafts died.

After two days of preparatory treatment with bovinine, I commenced skin-grafting after my latest method, first thoroughly cleansing the surface with wet Thiersch solution for forty-eight hours, when it is usually in a healthy condition ready for grafts. The grafts being now deposited on the surface, four layers of plain sterilized absorbent gauze are laid over the grafts, carried around the leg and sewed. I allow this dressing to remain on for ten days, constantly feeding the graft through the gauze, by keeping it saturated with the bovinine and salt water, two to one. This method proves quite as effective as changing the dressing, with rubber tissue to hold the grafts in place; while it has the great advantage of allowing no chance of a single graft being disturbed before it has become firmly fixed.

In this case, four minute grafts, of the diameter of a small pea, were distributed over the surface of the wound, covered and fed with bovinine blood as above described, without change for ten days. On examination at the end of that time, all the grafts were found not only immovably fixed, but grown by one-third of their diameter. Thenceforward, the surface was dressed every other day with plain sterilized gauze soaked in bovinine, covered with oiled silk, and bandaged. October 2d, twelve days from the start, the patient was discharged with a complete cure.

The Effect of Codeine.

The Medical Record (March 3, 1900) quotes the following from an article by Dr. G. J. Lochboehler in the Journal A. M. A. (Dec. 2, 1899): In epidemic bronchitis codeine is a valuable remedy for the relief of the harassing pain of the cough, and when combined with one of the coal-tar antipyretics the analgesic effects become more pronounced. It is a favorite drug in the cough of phthisis and chronic bronchitis, and its sedative influence is highly satisfactory, clinical data having shown it to be the best succedaneum for opium. Another advantage of codeine over morphine derivatives and one of special value in bronchial affections, is that the patients not only cough less but also expectorate more easily than after taking any of the morphine derivatives. The cough-dispelling power of codeine is such as to make it indispensable in phthisical patients, and a point of great importance in these cases is that it does not impair the appetite or digestion, never produces nausea, and can therefore be used uninterruptedly for months. For the many bronchial and laryngeal neuroses, the exhibition of codeine in combination with antikamnia (antikamnia and codeine tablets) meets with well-merited sanction.

Dipsomania.

Being a stimulant to the peptic and hydrochloric glandular system of the stomach, and exercising at the same time a sedative action upon the engaged mucous membrane—three chlorides Henry—is especially serviceable in those forms of dyspepsia and unequaled for the impaired appetite, nausea, morning vomiting and other symptoms accompanying dipsomania. —Medical Essays.

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VOL. 7. ST. LOUIS, NOVEMBER, 1900. NO. 5.

CONTENTS VOL. 7 NO. 4.

Roentgen Society of the United States. By Dr. J. Rudis-Jicinsky.

One of the Active Rooms in the Laboratory of Nikola Tesla (Illustrated.)

Excitation of the Crooke's Tube by the Static Machine. (Hysteresis.) By Dr. John T. Pitkin.

Answers to Inquiries.

Gunstock Deformity.

X-Ray as an Irritant. By Dr. Mihran K. Kassabian.

Bright Green Patches.

Lost Needles.

Ankylosed Knee.

Spectrum of Radium.

Ionic Conductivity of the Atmosphere.

Absorption and Ionisation.

Roentgen Rays.

Static Cataphoresis.

CONTENTS VOL. 7 NO. 5.

Coming Meeting of the Roentgen Society of the United States.

The Roentgen Rays with Associated Phenomena and their Application in Dentistry.

Stereoskiagraphy.

By-Laws of the Roentgen Society of the United States.

Skiagraphy not Radiagraphy.

J. M. G. BEARD, M. D.,
(Inventor X Ray Machine), Fruita, Colo.

The American X-Ray Journal.

Devoted to Practical X-Ray Work and Allied Arts and Sciences.

VOL. 7. ST. LOUIS, NOVEMBER, 1900. NO. 5.

The coming meeting of the Roentgen Society of the United States calls for the hearty co-operation of all makers of every kind of x-ray apparatus and all experienced users of same. Every form of current generator, every tube, every interrupting device, every localizer, every aid to posturing the patient, every mechanism for perfecting any x-ray picture or fluoroscopic examination, must be demonstrated at this meeting. There is much to do to standardize x-ray work at the point of highest efficiency, and this meeting can do more to spread knowledge than a year of unorganized effort.

The ordinary x-ray picture now has little standing in a court of law because it has no standard of accuracy, yet accurate pictures are made by many experts. At this meeting a committee will be appointed to consider and report official standards for giving x-ray pictures the accuracy required for legal evidence. It can be done. Some surgeons still say "X-rays be d——d!" but let them attend this meeting and brush up on apparatus and progressive methods and go home prepared to use x-rays to their advantage. Let every inventive manufacturer be present with his best ideas. Let every great hospital send its x-ray operator. Let surgeons and special practitioners come from everywhere and report their work. The crystalization of funded knowledge thus gathered will correct your errors, bury the obsolete, advance the fittest, and teach all workers the standards of the leaders in investigation.

Individual ideas and devices will be presented at this meeting that the majority do not know exist. No one in this field of work can afford to miss it. At the last minute there will be a rush for space or place on the programme and it will be too late. Do it in advance. Don't wait. In order to secure room adapted to the attendance and to install electrical facilities, it is necessary for those who propose to show apparatus to state in advance what facilities they will need. Every expert who has technique, ideas, or original device to present must speak for place on the programme before it goes to press. Every member of the society who expects to be present should also notify the committee on which depends the proper arrangement of all facilities. Do not delay. Send in your names at once. Tell others about it. There are surprises in store. Important new things are being reserved for this meeting and will be shown then for the first time. Members who want to present special features and cannot attend are invited to mail their papers to the secretary who will represent absent contributors. The chairman of arrangement committee is Dr. S. H. Monell, No. 47 West 27th Street, New York City, and all who have not notified him of their requirements for exhibiting space and electrical facilities should do so at once. For place on the programme, address the secretary of the society.

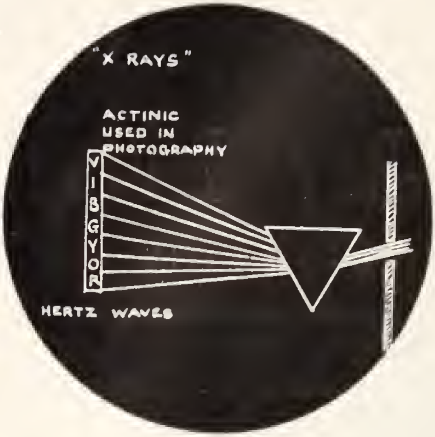


Fig. 1.

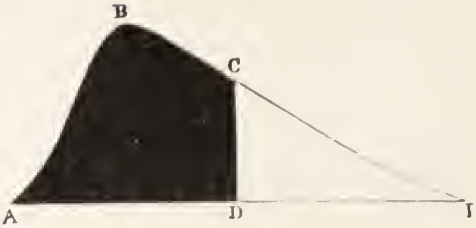
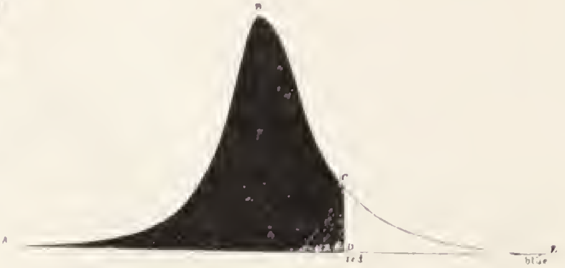


Fig. 2

Description of the first four figures in Vol. VII, No 3 American X-Ray Journal.



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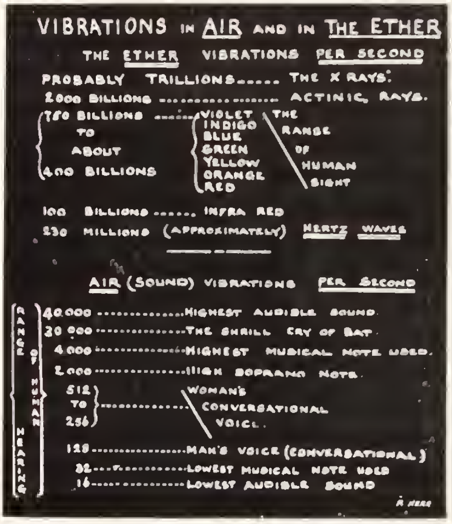


VIBRATIONS IN AIR AND IN THE ETHER

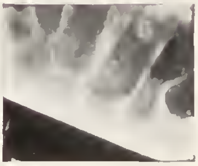
THE ETHER VIBRATIONS PER SECOND

PROBABLY TRILLIONS..... THE X RAYS.
2000 BILLIONS .... ACTINIC RAYS.
750 BILLIONS TO ABOUT 400 BILLIONS .... VIOLET INDIGO BLUE GREEN YELLOW ORANGE RED — THE RANGE OF HUMAN SIGHT
100 BILLIONS ...... INFRA RED
230 MILLIONS (APPROXIMATELY) HERTZ WAVES

AIR (SOUND) VIBRATIONS PER SECOND

RANGE OF HUMAN HEARING
40.000 ....HIGHEST AUDIBLE SOUND.
30 000 ....THE SHRILL CRY OF BAT.
4.000 ....HIGHEST MUSICAL NOTE USED.
2.000 ....HIGH SOPRANO NOTE.
512 TO 256 .... WOMAN'S CONVERSATIONAL VOICE.
128...............MAN'S VOICE (CONVERSATIONAL)
32...............LOWEST MUSICAL NOTE USED
16...............LOWEST AUDIBLE SOUND

Fig. 4.



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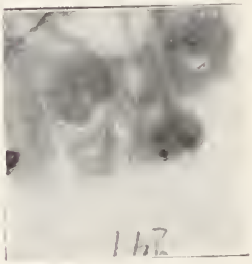

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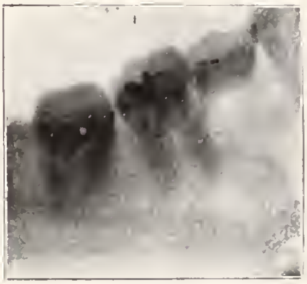

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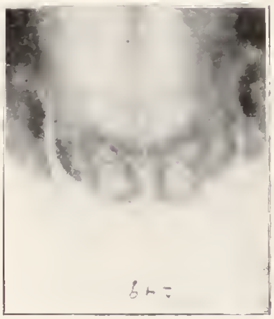

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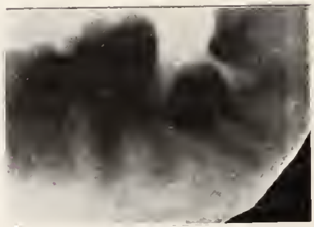

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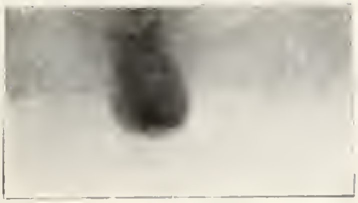

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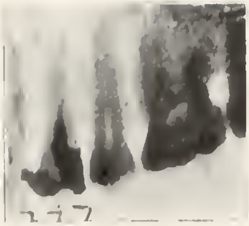
Fig 11



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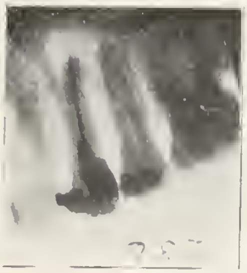


Fig. 13.

Fig. 16.

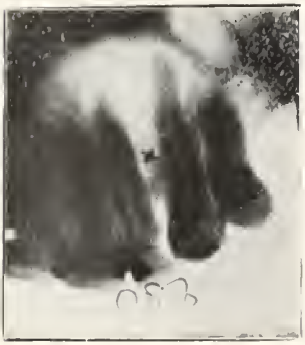


Fig 14.

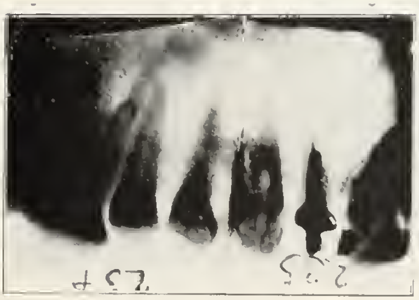


Fig. 15.

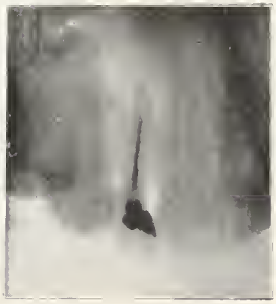


Fig. 17.

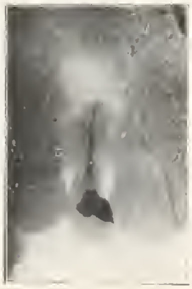
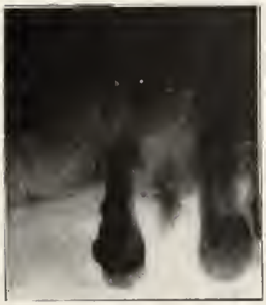


Fig. 18



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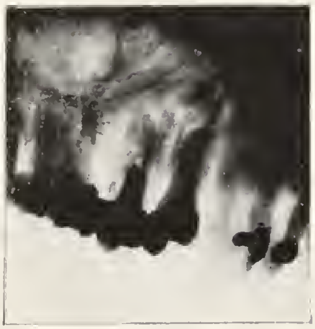

Fig. 20.

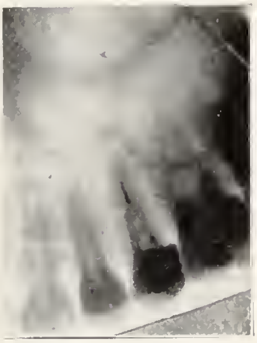

Fig. 21.

THE ROENTGEN RAYS WITH ASSOCIATED PHENOMENA AND THEIR APPLICATION IN DENTISTRY.

By Weston A. Price, D. D. S., M. E.

(Continued from page 775.)

Fig. 5 shows the condition of the superior arch of a boy at 10 years of age. Two generations preceding on his mother's side, had been lacking the superior laterals. The case was presented to have steps taken to prevent the shedding of his deciduous laterals. You can scarcely imagine the joy of that mother, who herself suffers considerable disfigurement from this cause when she saw the radiograph showing the development of these teeth that had been the object of her cherished but abandoned hope.

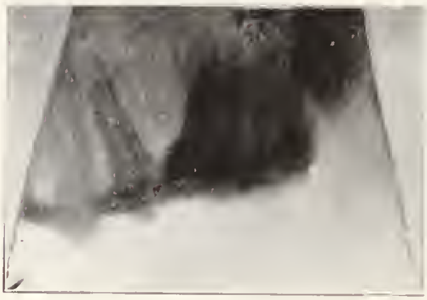

Fig. 22.

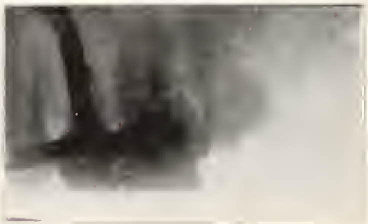

Fig. 23

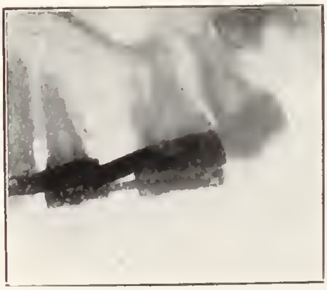

Fig. 24.

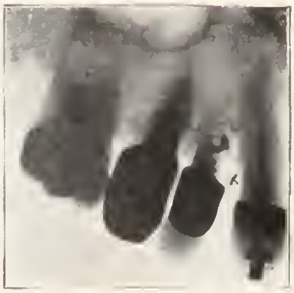

Fig. 25

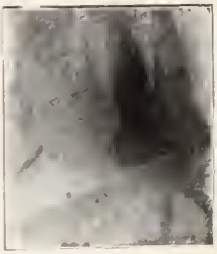

Fig 26.

The next (Fig. 6) illustrates the condition in a case of delayed dentition of the bicuspids. The cuspid has been erupted for some time and the first deciduous molar shed by this eruption. This superior arch is exceeding retracted. The radiograph shows that but one bicuspid has formed and it is thrown out of its course by about twenty degrees. It is absorbing the anterior buccal root of the first permanent molar. A course of treatment is quickly suggested.

In the next (Fig. 7) is a typical example of the appearance of cases where a permanent tooth fails to form and the deciduous is retained. In this case an inferior deciduous molar. A lady of about thirty years of ago discovered that she still had a baby tooth and felt so ashamed of herself that she hurried to the office to have it extracted. The radiograph settles all hope of it ever having a successor.

I will now show you a wonderful picture demonstrating the very early calcification of the enamel of the permanent teeth. (Fig. 8). It is taken of the superior arch of a baby boy of fourteen months, who has no deciduous teeth erupted yet in this arch. The radiograph shows not only the development of all the deciduous teeth, but also the commencement of calcification of the permanent centrals. But this is not all While his father is lacking his permanent laterals we can see clearly in the negative, which was a ten second exposure, even at this young age the crypts forming for his permanent laterals. I know of the joy of that boy's father at this information, for he is my boy.

An example of lost teeth is shown in next, (Fig. 9), which indicates the whereabouts of the missing bicuspids. There are very many cases of this class.

The next (Fig. 10) shows a lady's superior arch at about thirty years of age. When this picture was taken she was still waiting for her permanent teeth to erupt, but she need not wait longer for this lone second molar is all she is to have on that side. Five teeth are lacking on that side and three on the other.

In no class of cases is this means of diagnosis of more frequent service than for exploring the various deep pathological conditions. For example, the extent and location of abscesses, the direction and path of the fistula, and of very great importance, the most dependent point of the abscess. This picture (Fig. 11) shows the appearance of a blind abscess at the apex of an inferior incisor. It shows which tooth is affected and that no teeth in this vicinity have root fillings to suspect as imperfect.

In the next (Fig. 12) we have some information regarding a case of neuralgia of uncertain cause of years standing undoubtedly caused, as proven later, by the blind abscess at the apex of the first superior bicuspid. The abscess was evidently caused by imperfect root-filling, which is clearly shown to only extend half way to the apex. On opening up the canal I found putrescence in the apical half of the canal, This negative shows beautifully the cellular structure of the bone.

The next picture (Fig. 13) shows the same root filled to the apex. The blind abscess was drained through the buccal wall of the process.

These abscesses vary greatly in extent and their extent is clearly shown in good radiographs, as for example in this picture (Fig. 14) which shows a blind abscess of considerable dimensions, and of years standing, during most of which time it has been almost continually under treatment, so the patient informed me, through the root-canal of the lateral where it had its inception The lateral is the tooth nearest the figure 3. These numbers, you remember, are produced by placing metal figures, made of fine lead wire stuck on gum labels, upon the outside of the negative cover, when the exposure is made, and are invaluable for keeping records correct, and for identifying negatives. This picture shows beautifully the most dependent part of the abscess, which I have marked X, and the folly of trying to drain it through the root-canal. On establishing free drainage at X, by drilling through the process, and thoroughly sterilizing and cauterizing the pocket, a permanent and perfect cure was effected in a very few days.

In this next picture (Fig. 15) we have an exceedingly large abscess, and also one of long standing. It had a fistula beside the second bicuspid. The dentist sending the case for radiographing had labored faithfully, but with unsatisfactory results, to cure it. A crown on the lateral had been destroyed to examine the root-filling beyond it and the second bicuspid had been extracted and replanted in search of exostosis. The radiographs taken in sections, show the root of the lateral to be largely absorbed and a series of pockets difficult to drain between the roots of the various teeth. It also shows the abscess to extend beyond the anterior buccal root of the firs molar.

The picture now before us (Fig. 16) shows a remarkable change of bone structure taking place around a superior central incisor, one that had, a couple of years previous, received a hard blow, since which time it has been constantly elongating, though it is very solid in its attachments. The negative shows clearly the old base for the apex from which it has advanced, about three-sixteenths of an inch. It is an interesting study in pathology. The bone, though forming an unusually firm attachment, is evidently less dense than normal, and slightly honey-combed in structure. The peridental membrane is almost obliterated.

In the next picture (Fig. 17 we have another blind abscess with its evident cause, viz.: Imperfect root filling. The case was of thirteen years standing and had received extended treatments. I amputated the tip of the root, without extraction, at the point where the root-filling ended as shown by the radiograph (Fig. 17) and with splendid results. The next picture shows the same tooth after the root amputation (Fig. 18).

In the next picture (Fig. 19) we see how beantifully the bone has adhered around the stub of one of these amputated roots. This amputation was made in January, 1896. The patient claims it to be the strongest, solidest tooth she ever had.

In the next (Fig. 20) we see a broken broach protruding through the apex far into the tissue.

In this picture (Fig. 21) we see much of interest. The radiograph was taken to locate a piece of a cambric needle which the patient had broken in the root while trying to relieve an abscess. In was tnought to have been forced through into the tissue as the apex was found open. It is easily seen lodged in the root which was evidently bifurcated. This picture also shows beautifully the relation in this case of the teeth to the antrum. You will observe that the roots of the second molar pentrate nearly half way up through that cavity.

The value of Roentgen rays in Orthodontia is almost beyond calculation for it enables us to see just how our force is being expended. Probably the greatest factor in that work is to move the roots as well as the crowns. In this picture (Fig. 22) we see an attempt to draw two teeth together when alas only their crowns have been tipped toward each other.

This next picture (Fig. 23) shows the commencement of a case where separation the width of a tooth (one having been recklessly extracted) is required. And in the next picture (Fig. 24) we see how well this has been accomplished. Unfortunately, time only permits of one example of each of a few classes of case out of a great many.

The next (Fig. 25) shows beautifully the fit of these crowns and the depth of a pyorrhea pocket, supposed, marked X. The radiograph shows a perforation in the wall of the root of the first bicuspid through which cement has been forced into the tissue producing the suppuration and absorption, supposed to be a pyorrhea pocket.

In this next picture (Fig. 26) which is the last, we have an example of the service of the Roentgen rays in determining the location of third molars. This one is not erupted at all and lies at just right angles to its proper position as shown by the second molar. It would certainly be a difficult one to extract if you did not know its position.

CLEVELAND, O.

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*Talk before the Ohio State Dental Society, Dec. 1899.

Figures 1, 2, 3, 4 and 5, in the article of Dr. Price of this issue are fully described in the September issue of the AMERICAN X-RAY JOURNAL.

Application Blank.

ROENTGEN SOCIETY OF THE UNITED STATES.
APPLICATION FOR MEMBERSHIP.

I hereby make application for membership in the Roentgen Society of the United States.

Signed ....
Full name.

P. O. Address..

$5.00 must accompany each application. There is no initiation fee. The official organ, "THE AMERICAN X-RAY JOURNAL," free.

DR. J. RUDIS-JICINSKY.
CEDAR RAPIDS, IOWA.

STEREOSKIAGRAPHY.

Dr. G. P. Girdwood, of Montreal, in a recent letter to the editor of the American X-Ray Journal, says: "I am taking all my skiagraphs stereoscopically, and find that I can locate objects, especially needles, very much better than by any kind of wire gauze, large or small with intersecting angle and lines which are all additions to the work in hand and more or less complicates the surgery.

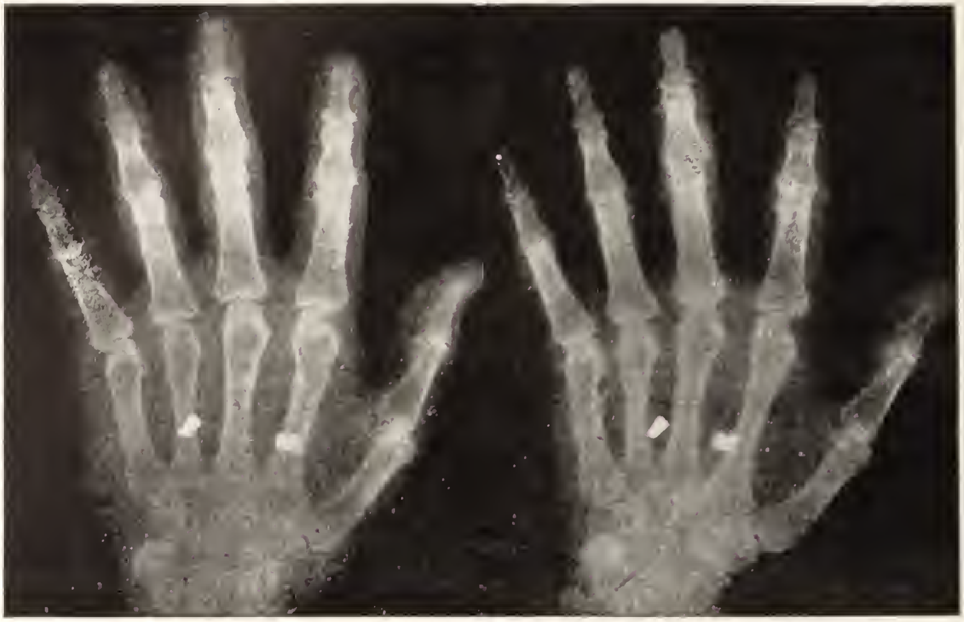
Dr. Girdwood was Assistant Surgeon Grenadier Guard. He is consulting surgeon to the Montreal General Hospital; professor of chemistry, Medical Faculty, McGill College; member of the Roentgen Society of the United States, &c., &c. We take pleasure in quoting some of his remarks from the Montreal Medical Journal.

The Doctor has suggested and put to practical use the "taking of two pictures of the part the tube being moved to a distance of 2½ inches to the right or left of the original position between the taking of the two pictures, the part skiagraphed remaining in the same place. If the platinum plate in the Crooke's tube was so placed in each case that a normal from the surface thereof would strike the same spot, then the two skiagraphs would present exactly the same differences as the pictures presented to each eye would have, and the skiagraphs so taken would give the true stereoscopic effect of seeing every part of the picture in its proper relative position to surrounding objects.

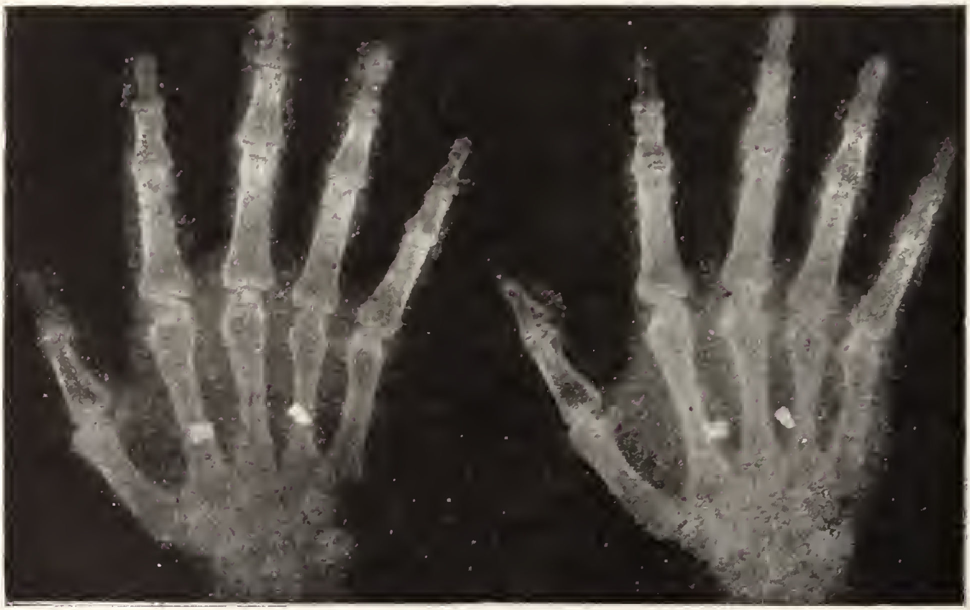
This idea was carried out, and the results were exhibited in Toronto at the meeting of the Society of Railway Surgeons, last June, and in March last, to my friend, Dr. Francis Williams, in Boston, who has done so much for Skiagraphy on this continent.

In carrying out this idea, and preparing the pictures now shown, which were the first, a piece of lead was fastened with a little gum paper on the back of the left hand over the metacarpal bone of the index finger. A second piece was placed, and fastened also with gummed paper in the palm of the same hand opposite to the metacarpal bone of the ring finger, and the hand placed palm down on a plate wrapped in yellow paper, in the usual way. The plate was put into the bottom of a card-board box without a lid and with a slit cut in one side large enough to admit the wrist, a line of pencil marked on the wrist, so as to put the hand back in the same position, and a pencil outline of the hand made on the yellow paper round the fingers. Then a plumb bob was suspended over the centre of the hand, and the Crooke's tube arranged so that the centre of the platinum plate should be 1¼ inches to the right of the pendulum string, and 12 inches from the plate, and the tube was rotated in the clip until a normal from the platinum distributer should strike the same point as the point of the pendulum bob. With the pendulum moved out of the way and one picture taken, another plate was placed in the same yellow paper, the pendulum bob replaced, and the tube so arranged that the centre of the platinum plate was 1¼ inches to the left of plumb bob line, and so inclined that the normal thereto would strike the same spot as before, and a second picture taken. The pictures developed in the usual way, gave two full size, indeed, slightly magnified skiagraphs of my left hand, and, when cut in pieces small enough to mount as stereoscopic pictures, at once gave the true stereoscopic effect.

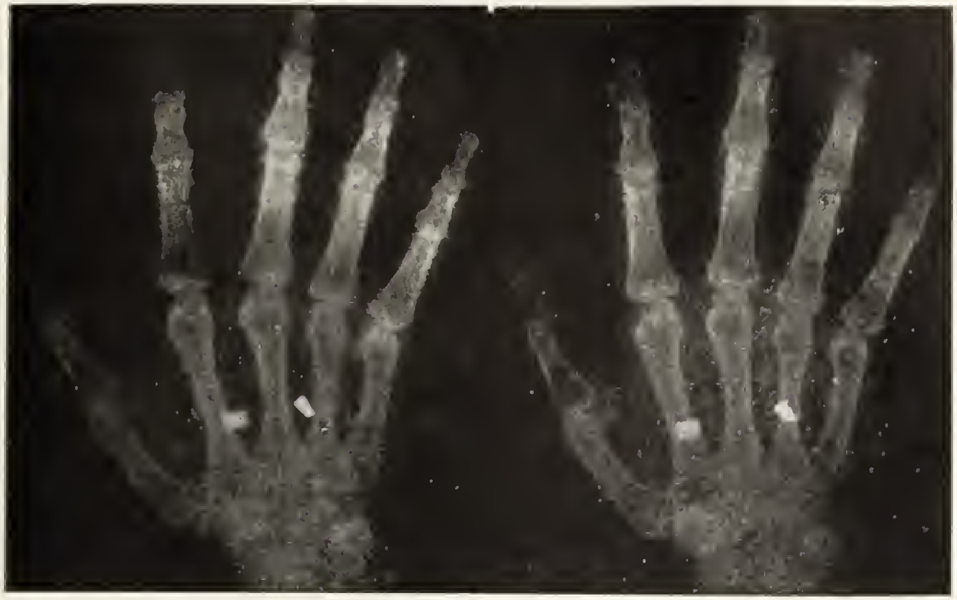
The skiagraph when taken has to be copied by camera, using the original skiagraph as a transparency, and putting the film side towards the camera, the pictures reduced to 2½, to 2¾ inches wide. These pictures are reversed from the originals as well as reduced, and these reversed pictures when printed give prints with white bones, white pieces of metal, on a black background. On mounting these with the right eye-picture to the right eye, and the left to the left eye, and viewing in



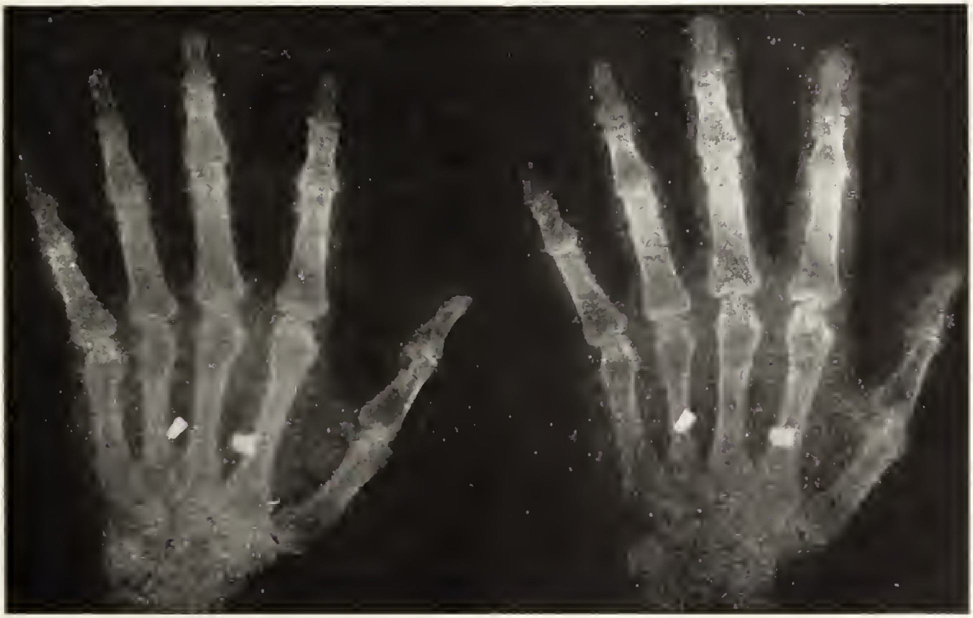
No. 1.—Left Hand Palm Down.



No. 2.—Left Hand Palm Up.



No. 3.—Right Hand Palm Down.



No. 4.—Right Hand Palm Up.

a stereoscope all objects stand out in perfect relief.

But, if the photographer use the original negative as a transparency to produce his diminished picture with the film side away from the camera he will produce diminished prints with white bones and white pieces of metal, but the hand will be reversed also, and instead of having left hand palm down you will now have right hand palm down, and, having obtained these two sets of prints showing the two hands palm down, if you reverse the prints in mounting, you will have the right and left hands with the palm up instead of down.

All four of these photo stereo skiagraphs have been reproduced by the process of what is called half tone, and been printed in the ordinary printing press, of which copies are here produced.

In the British Medical Journal of Dec. 3, 1898, an excellent account of the process for producing Stereoscopic Skiagraphs is given by Dr. Mackenzie Davidson. His process differs from that now recommended only in not making the normals of the platinum distributor in the Crooke's tube in the two positions converge. His are taken as though seen with two eyes, whose axes are parallel instead of converging on a point 12 inches distant, representing the appearance presented to each eye, when the axis of vision is convergent. The question of convergence or non-convergence of the lens in taking ordinary stereoscopic photographs was worked out in the early days of photography, some forty or fifty years ago, when Latimer Clark's camera for taking stereoscopic pictures was introduced, and the rotundity of the convergent lenses is an improvement. It is sometimes an advantage to mount the pictures to the wrong eyes, reversing thereby the side of view, as by so doing it is possible to obtain the effect of seeing the object stereoscopically from both palmar and dorsal aspect.

The four stereoskiagraphs now shown will, when viewed in the stereoscope, show left hand palm down, right hand palm down, left hand palm up, and right hand palm up. All are produced from one original pair of stereoskiagraphs taken, reduced, printed, and mounted in the manner described.

In these four pictures there is a piece of lead opposite the metacarpal bone of index finger, on the dorsum of hand, and another opposite metacarpal bone of ring finger, on the palm. In these pictures these pieces of lead appear at the same depth as regards the hands, and in all four, nearly in the same places, but appear to vary in position as regards the bones. This variation is due to the changed position and convergence of the tube in the two positions.

The first pair, representing left hand palm down, were the first pair. These reversed produced right hand, palm down, and the reversal of the pictures in mounting from left eye to right, and vice versa, give the effects of turning the hands over, and viewing from the opposite side.

This whole town, as well as Boston, was ransacked to obtain a portable stereoscope but without effect, and as a stereoscope is now almost a thing of the past, seldom seen in any house, it became necessary to make a portable one. The necessity culminated in the home-made stereoscope produced which is simply a pair of half lenses mounted with their thin edges to the bridge of the nose between two pieces of cardboard, with a thin septum of blackened cardboard suspended from the middle to cut off vision from either eye beyond median line.

It is quite possible for any one with practice to see these stereoscopic pictures without a stereoscope. By converging the eyes on infinity, there is a point where these pictures will be visible, one in the middle of the other two, this one is stereoscopic, and formed by the overlapping of the other two, and in this middle one the appearance of perfect solidity is seen."

The pictures must be reduced to the stereoscopic size and in doing this the doctor cautions against errors by the photographer. He must do exactly as told as it will be quite possible to have hands of opposite sides put together or to have the hands reversed altogether.

ROENTGEN SOCIETY OF THE UNITED STATES.

BY LAWS.

ARTICLE I.

The order of business at the annual meeting of this society at all times will be subject to the vote of two-thirds of the members present, and until permanently changed, except when for a time suspended, shall be as follows, viz.:

1. Calling the meeting to order by the president, or, in his absence, by one of the vice-presidents.
2. The Committee of Arrangements reports on the credentials of members after they have registered their names and address, and the name of the society or institution, or if in attendance as permanent members.
3. The annual address of the president.
4. Reading the minutes of last meeting.
5. Reading notes from absentees.
6. Resolutions introducing new business or instructions to standing committees.
7. The appointment of a committee to nominate officers and organize the standing committees and select the place for the next meeting.
8. Reception of the reports of special committees and voluntary communications.
9. Report of the Secretary.
10. Report of the Treasurer and Standing Committees.
11. Report of Nominating Committee, election of officers, and selection of delegates to other scientific societies.
12. Miscellaneous business.
13. Reading of the minutes and their correction.
14. Adjournment.

ARTICLE II.

The Committee of Arrangements shall verify the credentials of delegates, receive and examine all applications and letters of introduction presented by those wishing to become members by invitation; recommend the number and length of sessions, demonstrations, experimentations, etc., to be held daily, receive and announce all voluntary communications, and take general supervision of all the preliminary work for the completness of the annual exhibit, and of the arrangement of business coming before the meeting, report time to time as it may be necessary.

ARTICLE III.

Five members of this Society, including two officers, shall constitute a quorum, and may proceed to business.

ARTICLE IV.

Every member of this Society shall pay to the Treasurer the sum of five dollars annually before participating in the business of the meeting. There is no initiation fee. The official organ THE AMERICAN X-RAY JOURNAL, St. Louis, Mo., free.

ARTICLE V.

No money shall be drawn from the treasury except by a vote of the Society, save such money as shall be needed by Secretary to defray current expenses, subscription for the JOURNAL for each member, which amounts shall be approved by the President.

ARTICLE VI.

The Treasurer of this Society shall, before entering upon his duties give a good bond to the amount five hundred dollars.

ARTICLE VII.

There shall be appointed annually by the incoming president, for the next ensuing year, a Committee of Finance, consisting of three members whose duty it shall be to examine and audit the accounts of the Secretary and Treasurer, to pass upon all bills referred to them, to examine the books and accounts of any office, whenever they may think it necessary and to make their report for the past fiscal year immediately after the thirteenth order of business is disposed of.

ARTICLE VIII.

Members desiring to read a paper should forward its title to the Secretary at least one month before the meeting. Every paper received by this Society, and ordered to be published, and all plates and illustrations shall be considered the exclusive property of the Society, and will be published in the official organ of the same. No paper shall be read by title which is not actually in the hands of the officers of the Society.

ARTICLE IX.

Any violation of the Constitution or By-Laws shall constitute just grounds for impeachment.

ARTICLE X.

In case of charges being preferred against any member, they shall immediately be referred, without discussion, to the Committee on Conduct for investigation.

ARTICLE XI.

All committees shall be appointed by the presiding officer, unless otherwise ordered by the Society.

ARTICLE XII.

The meeting of this Society shall be conducted according to parliamentary rules, and the decisions of the President shall be respected, unless properly appealed from and reversed by the Society. A motion or resolution shall be reduced to writing if any member desires it.

ARTICLE XIII.

The Committee on Nominations shall report to the Society as candidates for president the two members who receive the highest number of votes at the meeting of the committee.

ARTICLE XIV.

Any of the forgoing articles of these By-laws may be amended or temporary suspended by a vote of three-fourths of the members present at any meeting.

It is suggested by Dr. Carl Beck of New York that the Roentgen Society of the United States standardize a different word than "radiagraph." Latin roots with Greek endings are not classical. Skiagraph is a full Greek word.

We will then very properly have:

Skiagram (ski' ag ram) skiagraph—the finished x-ray picture.

Skiagraphy (ski ag' ra fe) the art of making a skiagram.

Skiameter, an instrument for aiding in the recognition of fine differences in the density of x-ray shadows.

Skiametry, shadow measurement; applied to a method of determining the density of x-ray shadows.

Skiascope, (ski' as kop) the apparatus used in skiascopy.

Skiascopy, (ski as' ko pe) examination by either skiagraph or fluoroscope.

SURGICAL INSTRUMENTS
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Opium Usurped.

From the Antikamnia Chemical Company, St. Louis, U. S. A., have been received two samples of its products—Antikamnia tablets, and tablets of this substance along with Codeina. Antikamnia, as its name implies, is an analgesic and anodyne. It has gained much favor in the United States both for this and for its antipyretic action. A coal-tar preparation from several of the "amido" derivatives, it has been proved not to depress the heart after the manner of other coal-tar derivatives. Each tablet of Antikamnia contains 5 grs. of the drug (the usual dose), which can be repeated every fifteen or twenty minues, until three or four doses have been taken. The compound tablet consists of 4.75 grs. of Antikamnia and 0.25 gr. of Codeina, and has been especially brought forward for the treatment of pain where spasm or physical causes of irritation exist, and which is more amenable than to the synthetic drug alone. Both the simple and compound tablets merit a trial in neuralgic and spasmodic ailments, and as their freedom from injurious action upon the heart and circulation is invariable, they will certainly continue to be received by the profession with favor.—*Edinburgh Medical Journal,* March 1900.

THE AMERICAN

X-RAY JOURNAL.

Devoted to Practical X-Ray Work and Allied Arts and Sciences.

PUBLISHED MONTHLY BY THE AMERICAN X-RAY PUBLISHING COMPANY.

HEBER ROBARTS, M. D., M. E., Editor.

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VOL. 7. ST. LOUIS, DECEMBER, 1900. NO. 6.

CONTENTS VOL. 7 NO. 5.

Coming Meeting of the Roentgen Society of the United States.

The Roentgen Rays with Associated Phenomena and their Application in Dentistry.

Stereoskiagraphy.

By-Laws of the Roentgen Society of the United States.

Skiagraphy not Radiagraphy.

CONTENTS VOL. 7 NO. 6.

First Annual Meeting of the Roentgen Society.

President's Address.

X-Ray in Lupus Vulgaris.

The Electrochemic Action of the X-Rays in Tuberculosis.

Skiagraph by Prof. Horner.

Skiagraphs, Description of Same.

Phototherapy in Surgery.

Advice to Railroad Corporations.

Answers to Inquiries.

DR. J. RUDIS-JICINSKY, CEDAR RAPIDS, IOWA.

Member and Secretary of the Roentgen Society of the United States.

The American X-Ray Journal.

Devoted to Practical X-Ray Work and Allied Arts and Sciences.

VOL. 7. ST. LOUIS, DECEMBER, 1900. NO. 6.

THE FIRST ANNUAL MEETING OF THE ROENTGEN SOCIETY.

The first annual meeting of the Roentgen Society of the United States was held in the Library and Club rooms of the Grand Central Palace, New York City, December 13th and 14th. Important papers and a full report of the transactions will be published. The stenographer's report is not made up in time for this number of the JOURNAL.

When the full import and achievement of this meeting is judged from the lapse of a little time there must develop among thousands of physicians, surgeons, and others interested in x-ray work a deep sense of regret that they missed the greatest educational opportunity of four years. Without any doubt there was exhibited in the 2,600 square feet of space devoted to apparatus the finest collection of x-ray appliances yet brought together anywhere in the world. The immense value of comparison as an educational factor was here apparent. Side by side were seen competing instruments of the most varied types and construction. The strides that had been taken in mechanical improvements were visible on every hand. Two hours in this room was worth more to the incipient x-ray operator in search of information than two years of price list study.

The high degree of efficiency to which current generators, coils, static machines tubes, regulating, and other devices, have now been brought was impressed upon all visitors. The impression of the apparatus room was universally one of surprise at its comprehensiveness and quality. It would have well repaid five thousand physicians and x-ray amateurs to have compared notes in a single circuit of this room. In this issue lack of space prevents more detailed mention of features that should have been seen to be appreciated.

The literary program of the meeting contained twenty five papers. The educational possibilities of such a program and full discussion by experts can hardly be grasped by one not present at the meeting. The necessary business connected with completing the permanent organization of the society unavoidably lessened the limits of discussion and entrenched somewhat upon time allotted to papers, but the feast of good things whetted every appetite for more. Before the first session had closed it was realized that the organized action of an organized scientific body to regulate details and determine standards essential to accurate x-ray work was the imperative need of the hour.

Among new committees appointed to take charge of fundamental work may be named the following:

Committee on Standards.

Committee on Medico-legal Status.

25,000 Subscribers is our aim for 1901.

Committee on Scientific Research.

Committee on X-Ray Therapeutic Investigation.

Committee on Revision of the Constitution.

Officers elected were:

Dr. Heber Robarts, St. Louis, Mo., President.

Dr. J. P. Girdwood, Montreal, Cana., Vice-President.

D. H. P. Bender, Brooklyn, N. Y.

Dr. J. Rudis-Jicinsky, Cedar Rapids, Iowa, Secretary.

W. A. Price, D. D. S. Cleveland, Ohio Assistant Secretary.

Dr. E. A. Florentine, Saginaw, Mich., Treasurer.

Trustees.—R. Jm. J. Beard, Frinta, Calo.
Mr. W. C. Andrews, Schenectady, N. Y.
Lewis C. Cuter D. D. S. Dayton, Ohio.

The place of the next meeting was discussed and an invitation from the Mayor of Buffalo was read. The selection of place was left to the decision of the officers of the society. As the meeting closed the most dominant feeling among those who attended was a recognition of the revealed usefulness of the Roentgen Society and the importance of directing it so as to reap the best fruits of united and high minded effort.

PRESIDENT'S ADDRESS.

DR. HEBER ROBARTS.

Delivered before the First Annual Meeting of the Roentgen Society of the United States, Grand Central Palace, New York City, Dec. 3, 1900.

Early in 1896 Professor Monell, of New York City, proposed to some local associates a plan for the organization of a society devoted to this new science of x rays. He found poor encouragement and no meeting was held. This proposition of his was made before any organization to this end was effected anywhere in any country. Before the end of another year many societies had been formed, for local mutual advantage, both in Europe and America. It was in this year that I seemed to please myself more following the dim lights of Roentgen, than to pursue my more remunerative accustomed duties. Then came the parent journal of the world which was launched in the first week in May, 1897. In starting the AMERICAN X-RAY JOURNAL I did not consult anyone about the propriety or wisdom of my course. If I had it would have been swallowed up by the historic monster of disapproval. At that time there seemed to come a dearth or spell over the Roentgen world. The lay press had already ceased to print sensational matter about the x-rays and medical journals were not certain that the profession could read skiagraphs. But this body of thinking men before me is a powerful reminder that I was not alone in hope; the under silent tide was the thinking mind. What has been done to urge on this intellectual and human growth has been done by you. Every individual effort to acquire knowledge has added to the store-house from which we here hope to be generally benefitted. He who has done only a little in this line has done much to correct uncertain diagnosis and better the condition of man; but with the crystalization in each one of us, of the work of all of these investigators, what vast influence for good each one of us may be. These silent workers have responded to a call more human than any other purpose for which man can meet. To know whereof one is sick; to recognize the cause of disease, is the first of all knowledge. To ignore this is to ignore the foundation.

In January of this year, Dr. J. Rudis-Jicinsky, of Cedar Rapids, wrote to me for an expression about forming a Roentgen Society. At my request he wrote to forty physicians with similar inquiry. The answers were against the individual organization. Ex-Presidents of the American Medical Association and others therein interested modestly suggested its feasibility, provided it was agreeable to the great parent. Its existence was deemed only possible when it was accepted by and made contributory to their great associations. A few however agreed that a society was timely. There were three overshadowing reasons any one of which was enough for individual action. First, the x-ray was the greatest and most certain diagnostic assistant ever offered the profession, but required technical knowledge to properly operate, the discussion of which would be impracticable in another medical body. Secondly, the x-ray has remedial properties, in the line of diseases ignored as curable by the profession of medicine, and should not in discussion be hampered by unnecessary prejudices. Thirdly, since the x-rays contemplate radiant matter we need the assistance of physicists in our meetings, which could not be, as members of the American Medical Association. We decided therefore to call a meeting which convened in my office in St. Louis, February of this year. Here all preliminary arrangements were made. This gentlemen, is the fruit of that meeting and is the first regular meeting of the Roentgen Society of the United States, the first meeting of a national character for the purpose of advancing the interest of the Roentgen discovery.

William Conrad Roentgen was born in Lennep, a small town near Duesseldorf in Rhenish-Prussia, March 27th, 1845. (Duesseldorf is the native town of the greatest musical genius, Beethoven). He pursued his studies at Zuerich, Switzerland, under Kundt, and graduated in 1869. With his instructor he went to Wuerzburg in 1870 as his assistant. In 1872 he went to Strassburg, where he became a lecturer in 1874 at the Academy at Hohenheim, and soon after became adjunct professor at the University of Strassburg. In 1879 he was made ordinary professor (full professor) of physics at the University of Giessen, and in 1888 professor of physics of the University of Wuerzburg. It was in the physical laboratory of this University that he made his discovery, November 1895. He was knighted by the King of Bavaria, and his name is therefore von Roentgen, but his modest ways ignored the title. The German Emperor asked him to call at Berlin, where he explained the discovery to him. The Government then voted him a pension, but Roentgen declined to accept any money. On account of the extreme modesty of this man he was thought to not be mentally equal to his associates. Since his discovery these same men adore him as a genius. Roentgen is the highest type of the great, modest German professors. He is at present professor of physics in the University of Munich.

I know you will share with me the pleasure of this bit of history since so many errors have crept into all accounts of Professor Roentgen. These facts have been related to me by Dr. Carl Beck, of this city, a close friend and pupil of this great man.

In the beginning of January, 1896, the ordinary apparatus employed for x-ray uses would only blacken the photographic plate through the bones of the hand after thirty minutes exposure. Now ten seconds exposure will give a good picture of the entire body. At that time we cound not do fluoroscopic work at all. Now we can locate the various organs of the body, and in addition to locating dense objects and fractures anywhere, we can determine some pathological changes before they can be detected by any other known means. This last saying seems absurd to the "owls of old ways," who know nothing of the technique of good raying. Many of these sages of maturity have used the x-rays and formed conclusions without study and without instruction and without adequate apparatus. It is well known that incipient phthisis may be present and yet free from any physical signs known to percussion or to axscultation. The x-ray will make clear the nature of this disease to the Roentgen pathologist. Signs of pleuritic effusions can not give us exact information, but the x-rays can. Abscess of the brain, when the symptoms are masked cannot be located by any known outward signs. The x rays will locate it with precision. Aneurism in early stage before physical signs are apparent are unmistakable with the x-rays. A better understanding of internal growths in any portion of the body is obtained with the x-rays. We know now when and which kidney to cut for stone. In the fluoroscopic study of the heart much has been done, especially in detecting dilatation and atheromatus changes. In appendicular abscess, hematoceles, pregnancy and other diagnostic requirements the x-rays have a place. Bone and joint surgery have always commanded the best talent, but have always been masked with uncertainty. The x-rays clear up all doubt. We no more have to grope with the germ carrying probe, for now we can come mathematically upon the smallest missile anywhere in the human frame. Some surgeons having acquired their alleged x ray knowledge by instinct, have cut elsewhere than upon the bullet, and then written learnedly of the "uncertainties of the x-rays." We now do more than simply accurately locate foreign matter. We show by raying the relation of parts occasioned by structural changes, and the nature of the change. For instance, we can distinguish coxa vara by position and cares from necrosis.

The therapeutic advantage of the x-rays is prominent mostly because it contemplates the cure of those diseases known by the profession as practically incurable. In eczema, of syphilitic cause, x-rays will not cure but medicines will. The greatest number of eczema are not permanently curable with medicines but every case so far treated with the x-rays have yielded permanently. Lupus has baffled the world of thought and application in search of a remedy and it is only from some obscure place we ever read of a cure. With the x rays failures are not known and the cures are effected without giving pain or leaving scars. Early consumptives improve with raying.

Scar tissue disappears under the influence of the x-rays. Inflamed tissues improve while raying. The analgesic effect is pronounced, as observed by all operators. Inflammation can be set up by the x-rays, when the light has been prolonged with energy sufficient to produce a trophoneurotic change. We are not certain that the rays have bactericidal properties. The cures effected may be due to the greater potency in phagocytes—a change brought about in the granular realm and blood ratio.

After all this glorious record sufficient for a hundred years, moving on we see the necessity for standardizing some method for accurate diagnosis and therapy. Our language should express what it means and the picture whether on plate or screen, should have an intelligent interpretation. We realize this must be done before we can be said to have a science acceptable to the thinking people and especially to the courts. I propose that we standardize diagnosis first and then fix an approved therapy for the x-rays. By standardizing methods for x-ray diagnosis I mean there should be a way or fixed rule for taking x-ray pictures, which shall be approved by this society. The method shall accurately skiagraph a fixed land-mark in all instances. So far as my conceptions go I cannot conceive of a first-class x-ray diagnostician who does not possess a fair knowledge of anatomy and pathology, on the one side, and technical training of the use of the apparatus and of the skiagraphic

The Smithsonian Institution, the U. S. Surgeon General's Office

reading on the other. However, in some instances accurate work may be done by some who do not possess the first essentials. In skiagraphic work the subject must be immobilized, but it is not necessary that the patient should lie down in all instances. If it is the chest or upper extremities to be skiagraphed, the patient may sit erect with the proper supports. In all cases some definite pre-determined land-mark should be taken, either artificially made or taken from some well known promitory. If the chest is to be examined it may be for a broken bone, pleuritic effusion, consumptive area, a bullet, but it matters not what. Our duty is to first settle upon the object with fluoroscope and then determine a line—fix a line as nearly as possible at right angles to the body through the object sought. This can be done with any convenient ray-absorbent right angle device. The anode is placed with some care in a position, that it can without trouble be shifted, so that the object sought for in the chest falls within the arms of the ray-absorbent. If necessary, sights may be used and marks made on the skin. To obtain perfect position the same maneuvering should be done transversely or at right angles to the first. The essential of all examinations and skiagraphy, is to know at what two points the rays are passing in a direct line through the body or organ. This must be known in order to be able to judge intelligently of the distortion by position. If in a skiagraph we can point to a particular place in which there is no distortion, save the axis with equal radii, then all other points about have a measurable angle. This particular place is the land mark and may represent the ray-absorbent, or the object sought, at the caprice of the operator. When in possession of these rudiments, and when the distance from the object to the plate is known, and that from the anode to the plate is also known, then it is not a difficult matter to interpret a skiagram. In reading we must have a starting point and begin free from error. If we are to skiagraph the hip, the position of the anode should be over the angle formed by the lines intersecting, one drawn transversely across the pubes and the other falling to the first from the anterior superior spinous process. Ray-absorbent must be used if ocular proof of a skiagraph is called for. In courts of law the object sought in a photograph must be unimpeachable. This can be obtained and is simplicity in skiagraphy. If it is desirable to take both hips in one picture by the x-rays, a plumb line may be suspended from the anode from a frame provided for the purpose. The plate is first put in position and the plumb dropped to a bit of ray-absorbent affixed to the covering of the plate. The subject is now so adjusted over the plate that the plumb suspended, will point to the median line at the superior border of the symphysis. Here another ray-absorbent is fixed. In the skiagram we have but a single land-mark, and when the thickness of the subject is known, all portions of the plate are interpreted. If the picture is of an adult male (sex and age differ in a picture) with toes up, the great trochanter is most favorably shown, and also the neck of the femur in its normal length. If the tube is 18 inches from the plate, and the neck 3 inches from the plate, there will be a shadow of the neck magnified about 1-6 greater than the normal. But the shape and position is nearly correct and the angle to the shaft is about 128 degrees. Everting the foot elongates the neck, inverting the foot shortens the neck. The angle of the neck is increased by placing the tube above the symphysis but the neck is shortened, and by receding more a point is reached where the head and neck appear as one. If placed below the symphysis the tuberosity and head may be made to appear as one,

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and the neck have the false position of right angle to the shaft.

The therapy of the x-rays have their selective action similar to the therapy of drugs. There are cases of idiosyncrasies, probably, as there are in drugs. I am not sure that this is true. A tube that will show the bones of the hand five feet away is good enough for therapeutic effect for all treatment of the skin. The part to be treated is exposed and all other parts are covered one-half inch thick with cloth, and over this tin. The tube, ten inches from the surface, should emit rays without any or at least very little electrostatic effect. The patient laying on the table may be somewhat charged but always with impunity. No sparking or sensation is felt. The coil and static machine will do the work equally well. Reaction may be looked for after the twelfth treatment, and bronzing is the first symptom. The duration of the treatments, which were twelve minutes each daily, are now reduced to eight minutes, alternating days. In the case of hair removal, the sixteenth treatment will cause them to whiten and begin to fall. About the twenty-sixth treatment the skin scales and a crusty sensation indicates needed cessation of the rays. After a week, there being no pain nor sensation renew the treatments five to ten times. In lupus vulgarus some inflammatory reaction is needed. Loss of time during these treatments does not impair the good effect the raying has already done. After having weighed the case, as to the nature of the disease, the point to establish is to fix the degree of radiance; and acting with a standardized tube and from a standardized method, any operator with a fair amount of judgment may become an x-ray therapeutist.

But we must be educated in the technique of this profession. This society should be in touch with every accredited x-ray therapeutist and diagnostician in the States, and also know those who are incompetent.

I have reflected herein some of the hope of the future and glanced retrospectively probably occupying too much of the time that more properly belong to the discussion of the many valuable papers before us. But I felt a little enthusiastic as your first president and doubly urged on by this magnificent display and attendance.

X-RAY IN LUPUS VULGARIS.

BY DR. JOS. HOFFMANN, VIENNA AUSTRIA.

Written for and Read at the First-Annual Meeting of the Roentgen Society of the United States.

[Translated by Dr. J. Rudis-Jicinsky.

Upon the use of the Roentgen rays in the treatment of lupus vulgaris we have favorable reports from many sources: Schiff, Kummett, Holland, Rieder, Gocht, Lovtet, Geroud, Fiorenti, Luraschi, Ravillet, Musham, Jones, Rudis-Jicinsky, Knox, Albers and Schoensberg. We know that the powerful x-ray has an influence upon tissue, and that in the application of the same in cases of lupus we have the best means for producing irritation for an artificial inflammation and conversion of unhealthy ulceration into open and healthy granulation.

The x-rays are irritant in their action, this being due to the violet rays in them. This irritation effects not only the skin, but goes up to the point of penetration, to subcutaneous tissues also. They may produce changes in the epidermis or its appendages, or act upon the deeper tissues. These changes are all of inflammatory reaction, varying from slight erythema through all the degrees of dermatitis up to necrobiosis. We are now able to demonstrate that these conditions are due to the electrochemic action of the rays, and are not a "burn" when properly applied and this electrochemic irritation controled, the x-ray becomes of great value in the restoration of parts to health,

We reach more reading people

especially those that have suffered, as in lupus vulgaris from bacteria. For these cases we are after the bacillus tuberculosis, the causitive agent of lupus. The irritant bring to the diseased tissues an increased blood-supply, so that they may resist the attacks of the germs, which finally are expelled or destroyed.

I have investigated the action of the x-rays on both healthy and diseased skin, and came to the following conclusions:

The mild irritation is of marked therapeutical value in cases of lupus vulgaris; chronic eczema; destruction of hairs growing on moles; in diseases of hair and hair-follicles, such as sycosis, tinea tonsuraus, favus, where the removal of diseased hair is an essential part of treatment; in all inflammatory affections, where the purpose is to stimulate the tissues and cause absorption of inflammatory products; in certain specific affections, where destruction or absorption of tissues of low vitality is desired, and occasionally in cases of acne, lupus erythematous, psoriasis, elephantiasis, hypertrichosis and freckles.

On the other hand, the following accidents may result from the excessive iritation from the x-ray tribe; simple erythema, dermatitis of varying severity, sometimes follow by abscess and necrobiosis, alopecia, loss of nails, pigmentation and desication of the epidermis.

The x-rays penetrate the tissues of the body, and when applied to the lupus seem to have a selective action, because the lupus nodules will break down before the surrounding healthy tissue will and can be affected. It seems to me that the same actinic rays of the x-rays, which cause rearrangement of molecules and formation of new salts upon the photographic plate, have the same power in molecular building up of the tissue-cells and acting upon their metabolism. Heretofore the x-ray has been applied to the treatment of diseases of the skin only, but as lupus is a tubercular affection and is curable by the x-ray, it seems to me that this therapeutical agent has to be tried also in tuberculosis of other parts. We shall see. From our records we take the following four typical cases of lupus cured by the x-ray:

Case 1.—P. S., age 34, suffering with lupus vulgaris of the face ana nose for about 12 years. Ointments, cauterization. excision and transplantion twice, but the lupus would return after each treatment. The trouble was spreading at the time of consultation, and the affected parts were much infiltrated and of a deep livid color. There were many irregular partly confluent ulcers, and few nodules on the nose, upper lip much infiltrated, prolabium crusty and gums at the incisor teeth swollen. I tried the x-ray treatment, short sittings every day, beginning December 18, 1897. On January 15, 1898 a considerable improvement was noted. Healthy parts were oiled and protected with staniol. Exposures prolonged and on April 19th of the same year treatment was stopped, skin was smooth and scar tissue fine.

Case 2.—A. M., had for 6 years a lupus valgaris on the nose. In the beginning there was an appearance of yellowish, deep papules, which gradually extended and finally appeared in the form of yellowish tubercles and apple-jelly like nodules, with abundant secretion forming crust, irregular and unhealthy ulceration. Sometimes the lupus was quite amenable to treatment, but reappeared again near the old scars. I tried at last the x-ray. Healthy tissue was protected with staniol and radiation begun with the tube removed 15 inches. After three applications of the x-ray, for 30 seconds each, nodules were diminished, same with infiltrated lymphatic glands. Later the nodules fall off and the unhealthy ulceration under prolonged radiation were changed to open and healthy granulation. This was two years ago, the patient being now completely well.

Case 3.—A. H., 28 years old, lupus vulgaris of face and nasal cavities for eight years. The affected places red with numerous nodules and crusts. Previous treatment failed. July, 1899, treatment with x-ray sittings three times a week. October 10th improved and in November treatment discontinued. Everywhere the scar tissue smooth, not very visible. No relapse.

Case 4.—L. S. lady, 30 years of age. Lupus involving the entire side of the face. I have tried the new method of treatment with short sittings—only few minutes, but daily, and the good results were obtained in ten weeks. No relapse.

I have given you only three illustrations from my own practice. The advantages which the x-ray method offers are in the way of convenience and the rapid and sure results. Practically all those cases which have been treated by this method were chronic, persistent and grave. There is no pain with this treatment, and an excellent character of the scars, which nearly approach the normal skin in appearance. And that means surely something.

THE ELECTROCHEMIC ACTION OF THE X-RAYS IN TUBERCULOSIS.

By J. Rudis-Jicinsky, A. M. M. D., Cedar Rapids, Ia.

Read before the Roentgen Society of the United States December 14, at the Grand Central Palace.

The early diagnosis of tuberculosis pulmonalis can be made with the help of the Roentgen rays very early. The infection usually begins at the mucous membrane of the bronchi and of the air passages, and the isolated foci of infection can be made out on x-ray examination, just as well as the haziness over the apices of the lungs. The first stage of the disease, shows marked contrast to the shadow thrown upon the fluoroscopic plate in case of consolidation. There is no question in my mind that we have to find some way to attack and remove the cause of disease before any medication should be used. It is the seat of the disease with the operations of the causative agent—the germ—which must be attacked. The stomatic medication, serum therapy, change of climate, cataphoresis, etc., has been tried already and tuberculosis pulmonalis still remains the disease most to be dreaded.

The first attempt to apply x-rays for therapeutic purposes was made by a Freund to remove by this means the hair from a nevus. Then came the unexpected accident on account of prolonged radiation and soon it was found that the x-rays caused irritation, which had effect upon some bacteria, not of a marked electro-chemic character only, but that they were in some cases most powerful bactericide known. The successful treatment of lupus vulgaris, with the x-rays, is the best proof of it. Since 1896 I have reported few cases of lupus cured with the x-ray myself and there are many others on record abroad and in this country—Schiff, Freund, Kummell, Hoffmann Mracek, Holland, Jones, Knox, etc.—who recommend the x-ray treatment in tuberculosis of the skin, as the latest and most successful. In my cases at leas it gave satisfaction when all other methods failed.

Knowing this and thinking of the destruction of the bacilli in the living structure, with a proper immunizing of the organism against the effects of the bacilli, I have been independently experimenting for the last four years, pursuing my own way in the direction to solve a problem, so far as yet very difficult. That a cure in the first stage of consumption is not only possible, but happens very often, we know from Naegeli, and others.

With the cases of tuberculosis of the skin it seems to be fully demonstrated that the bacilli may be destroyed locally with the x-ray or that some necrosis of healthy tissues caused by raying renders the parts unsuitable for the growth of the bacilli. As lupus is a

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* American X-Ray Journal, October, 1898.

*Virchow's Archid. 1900, Clx 426.

Though we are classed amongst the Scientific

tubercular affection and is curable with the x-ray, it seems to follow that tuberculosis of other parts should respond to the same treatment if proper raying of sufficient intensity be applied. If irritation, by attracting the blood and phagocytic white corpuscles destroy the bacillus tuberculosis externally, as in lupus, why not bring the rays into the direct contact with those parts of the deseased lungs, which the fluoroscope or the skiagram shows to be tuberculous?

We know that the infecting agent of tuberculosis is the bacillus. That this disease cannot be without it, and when it exists it is invariably given off, when the disease has progressed far enough, in the form of broken-down tissue.

The first step of our experimentation was not difficult. With the help of the microscope the presence of the bacilli in the sputum was determined. A certain quantity of the sputum was placed into a fish-bladder filled up with bouillon, containing two per cent papton and six per cent glycerine, and closed, the whole being properly boxed and marked. Each box was then alternately exposed to the x-ray.

Before exposure to the x-ray I made stroke-cultures from each box named, on glycerine agar, placed the same in broad oven for ten days, at a temperature of 37° C. This preparation agitated once a day showed under the microscope a thick curled-up center around which threads were wound with the bacilli in profusion. These pure cultures with others: antrax, streptococci, stophylococci, typhus, diphtheria and gonorrhea were also alternately exposed to the x-ray and the results of these experiments showed that certain x-rays are similar in their active properties to the rays of light at the violet end of the spectrum and that various bacteria react under such radiation differently according to the quality of the plasma of the liquid they contain. With simply alkaline culture media the propagation of bacilli tuberculosis is secured and the growth of the germs accelerated by the influence of an x-ray tube, but on acid media the bacillus tuberculosis is rendered inert and may be destroyed.

Under x-ray radiation:		Media: Acid	Alkaline
Bacillus antrosis, result:		Negative	Negative
Bacillus tuberculosis in sputum, destroyed in		18 minutes	Negative
Bacillus tuberculosis in flask, destroyed in		50 minntes	Growth accelerated
Pivillum choleræ, in flask, destroyed in		51 minutes	55 minutes
Bacilli of diphtheria	in flask	46 minutes	48 minutes
Bacillus of typhoid fever		45 minutes	49 minutes
Streptococcus		Negative	Negative
Stophylococcus		Negative	Negative
Micrococcus pyrogenes albus		Negative	Negative
Micrococcus gonorrhea		35 minutes	49 minutes

The third stage taken was to inoculate ten guinea-pigs and ten rabbits from above cultures. Beginning with the tenth day they were all exposed to the x-rays daily. Eight of these animals whose secretions were rendered alkaline, six guinea-pigs and two rabbits, died of tuberculosis. The others inoculuted from the box with acid media having been in the first stage of tuberculosis so to say, and exposed to intense raying daily for ten seconds, were under observation living and seemingly in good condition for two years.

The bodies of the six guinea pigs and two rabbits were dissected. In all these cases we found cheesy transformation, lungs undergoing destruction with cavities. In the walls of some of the bronchioles, semi-solid granulation, tuberculous. The apices and the opposite upper lobe gave marked traces of repair, showing plenty of more or less structureless connective tissue without cheesy material. In majority of the cases we had obliteraiion of the pleural cavity. In two cases depositions in the brain, one in the liver and intestines. In forty per cent of the animals treated with the x-ray, and killed after elapse of two years, the post mortem examination showed that aithral ante of tuberculous process has occurred in the real sense of the word when acie condition was produced. Giant-cells were not found, but chalky masses enclosed in dense tissue, connective tissue and adhesions, without the bacilli tuberculosis.

It is not necessary to demonstrate any further that the rays penetrated deeply into the tissues of all those animals treated. Every skiagraph of any part of the body is a sufficient proof of it, and the experiments, as we were able to show, gave us the opportunity to observe also the electrochemic action of the x-rays almost to their point of penetration.

The discovery of the bacillus tuberculosis was the first great step in medicine, the recognition of the fact that tuberculosis is a contagious disease, was the second. The next very good step forward, since the discovery of the ray by Professor Roentgen, is surely the very important application of the x-ray, in connection with early diagnosis of tuberculosis. Keeping in mind that very large proportion of those affected with tuberculosis may recover their health under proper treatment, or their life may be prolonged * if the diagnosis is made in time, we will find in the application of the x-ray a great help to us **. Abrams says: *** "The results of treatment in special sanatoria for pulmonary tuberculosis are marvelous. From twenty-five to forty-two per cen. of cases are cured." The diagnosis with the x-ray is not difficult. But the next step is yet to come. It is to be hoped that the step may mean the recognition of the method of cure with the unknown ray, when it becomes to be known to all of us.

Satisfied with the results of my experiments described above I have in the last two years, with patient's consent, applied the x-ray to every case of earlier stage of tuberculosis which I had, or which was sent to me for diagnosis. Nearly all these cases giving an x-ray examination: Slight laziness, indicating the beginning of tuberculous infiltration in the apices, and the range of the excursion of the diaphragm during forced inspiration materially limited—I have treated accordingly, attacking the seat of the disease, forgetting not the three most important factors—pure air, the temperature and good hygienic surroundings. From twenty selected cases in one year one died with intestinal complication, tubercular, another committed suicide after two sittings, and the rest is doing comparatively well, only four being a complete failure. Exposure varied with each case from ten minutes to fifteen per sitting. The rays have to be observed with the fluoroscope at each exposure, the tube tested to see that it was working at its best, and the apparatus must be under full control of the expert, who with the help of the x-ray will not only determine what portion of the tissues are diseased, but locates also the area over which the diease extends and what changes have taken place since the first exposure. The treatment ceases with favorable condition of the patient, and when the lungs give us reports—the plate of the fluoroscope an image of shadows of new formed adhesions—which are opaque to the x-ray—in a transparent field of healthy tissues or when the range of excursion of the diaphragm is increased.

The patient is seated in a chair without a back, the Crook's tube held about 15 to 18 inches from the body, directly in line with the diseased spot, showed on the screen of the fluoroscope in front, which must be applied firmly and to the bare chest if necessary. At the next sitting the procedure is repeated, the Crook's tube being in front. The proper distance between the light and the screen is about 30 inches, but this depends altogether upon the character of each given case and may be gradually extended or dimnished.

It is very difficult to find just the length of exposure to make in these cases. If you do not

Since diagnosis is the foundation of all practice the

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*Undersoyelver om Lungentuberculoseus Hyppighed og Helbrudlighed, Christiania, 1896, Jeus Bugge.

**New York Medical Journal, February 18, 1899.

***Philadelphia Monthly Medical Journel, March 1899.

*Walsh: During quite breathing in a healthy lung the excursion of the diaphgram, as registered by the liver, is about one-half inch; during forced inspiration from 2 to 3 inches, little more on the right than left.

expose long enough and at regular intervals, the desired result is not obtained; and if we expose too long, we may set up an inflammation which may cause hemorrhage from the irritated lung tissue and weakened vessels and accelerate the growth of the bacilli, instead to distroy them. In other words, the diseased tissue of the lungs is of such low vitality that the influence of the x-rays may cause its absorbtion or even distinction before having any marked effect upon the healthy tissue. The x-ray seems to have a selective power in these cases, just as well as in tuberculosis of the skin. While removal of the bacilli or better to-day of the cause is essential to permanent cure, it is well—I am speaking of earlier stages only—in order to retain the patient, to institute some measure to support the untritional changes in the healthy part of the lung tissue with increased metabolic change, stimulating more rapid and complete oxidation of the blood, and nothing has answered so well in my cases as the static electricity which may be used alternately with the x-ray. Such static electrization tones up the patient for the next x-ray exposure and with all the other hygienic and therapuetic measures necessary according the symptoms, will give the nature an opportunity to deposit healthy lung tissue and the repair may take place. The great function of the x-ray in our cases with the results so far obtained being very encouraging, would be to destroy the bacilli directly in the lungs and the franklinization is to improve and restore untrition not only of a part but the whole.* By such process of treatment the healthy tissue is kept immunized on one side and on the other the further proliferation of the bacilli stopped. The majority of our patients improved, the bacilli disappeared from their sputum, the night-sweats ceased and now the patients do not cough and say that they feel good and are restored to usefulness. But I would not like to state that the cases were cured by the x-ray exposure only, for it may have been spontaneous cure in all of them, but they are certainly now well, and are feeling good and also just as certainly had tuberculosis, when our treatment began.

As to the danger accompanying the use of the x-rays, I have to state and can prove it from my experimental work, that there is absolutely none, when proper care is taken. During the actual daily applications of these rays to my patients for diagnostic and therapuetic purposes I did not have one case of dermatitis or necrobiosis of my own,* and if we take certain precautions, use proper apparatus and do not prolong our exposure unnecessarliy, the rays will be avoided. At the first trace of slight burning sensation, itching or trace of brownish coloration of the skin, the treatment must be stopped at once. It must be certainly employed systematically to secure some results, because the x-ray may act not as a stimulent as desired, but as an irritant, giving us all the inflammatory phenomena not only at the focus of irritation, but spread perhaps over a larhe contiguous surface with changes, directly dependent upon the disturbances of the circulation. It is clearly apparent that the x-ray in sufficiently form is made to reach the tubercle bacillis in the living tissues, its destruction may follow, and it remains for us to demonstrate this fact not only theoretically, but clinically. The employment of the x-ray in cases of phthisis pulmonalis is worthy of extended trial.

This is a practical question which, with practical tests, will show us, if we have finally found the weapon against the baneful blight, and can put an end to the spread of the terrible and deadly contagion.

Let us have a number of establishments, where this experimental work would flourish, sanitarium, public and private, which would do a world of good by curing the curable tuberculous cases, and taking care of the hopeless ones, thus diminishing countless centers of infection.

---

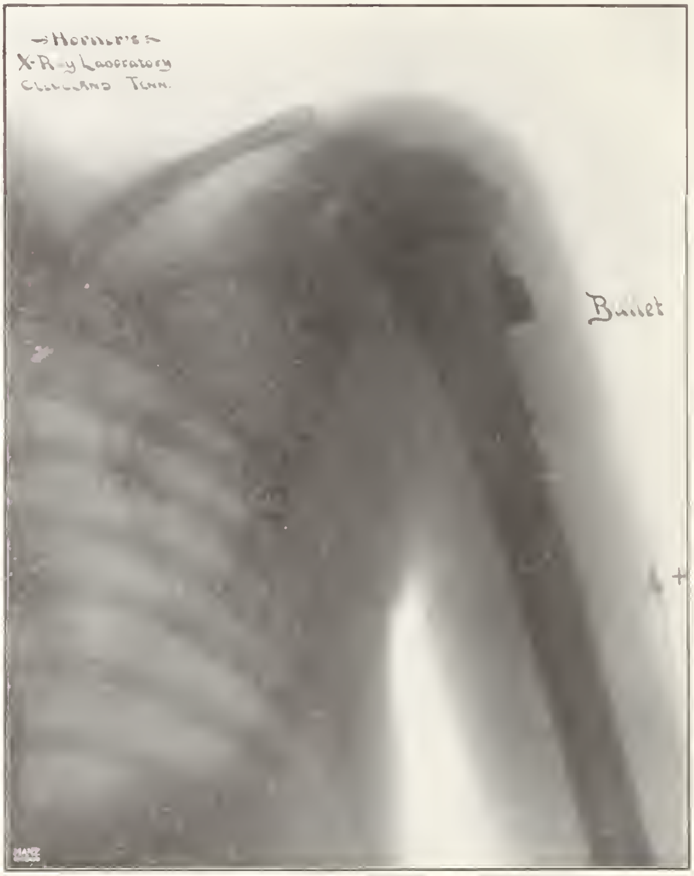
* International Congress of Medical Electrology, Radiology, Paris, 190 . D. A. Tripier: "Franklinisation."

* "New York Medical Journal," March 17, 1900. By the author

American X-Ray Journal is essential to all doctors.

The skiagraph made by Prof. W. O. Horner, of Cleveland, Tenn., herewith shown, is a clear reminder of the diagnostic value of the x-rays. The germ carrying probe had been used in vain to locate the bullet and the patient necessarily subjected to danger by this old time procedure.

The arm shows the point of entrance of the bullet very clearly. Some stain of lead was probably left at this point since the skin is tense and offers greater resistance than other soft structures. The bullet is a 38 calibre and passed through a board 1¼ inches thick and was fired for the purpose of scaring some boys. It struck the right arm of this innocent lad while celebrating Hollow'en. The bone was struck nearly opposite the point of entrance marked with x but not injured. The ball ranged upwards and was spent at the surgical neck of the humerus as seen in the skiagraph.



Editor American X-Ray Journal:

Dear Sir: In the November number of your journal, Dr. Carl Beck, of New York, suggests that the Roentgen Society of the United States, standardize a different word than "Radiograph," and offers "Skiagraph" as a substitute.

The doctor has overlooked the fact, that he has proposed a series of words that have been, and are used to designate things entirely different, for instance, Skiagrapher, Skiagraphy and Skiagraph have long been in use and refer to the maker,

Hope of reward is an inherent attribute and the

making, and the finished drawing of the vertical section of a building, showing its interior arrangement. The word "Sciascopy" however, has been adopted by the ophthalmologists to describe a method of examining the retina. The Century Dictionary says that this word is used to designate "the method of estimating the refraction of an eye by throwing into it light from an opthalmoscopic mirror, and observing the movements which the retinal illumination makes on slightly rotating the mirror." This definition certainly describes something entirely different from what Dr. Beck proposes, and as the word was evidently coined to describe this particular test, and has been used quite extensively by medical writers both in this country and abroad, and in addition to this has been incorporated in several modern dictionaries, there would seem to be no excuse for appropriating it, or any of the words quoted above.

Hybrid words may not be considered "Classic" but they are already so numerous, that the permanent addition of one or two more would hardly seem a matter of much importance.

Very Truly Yours,
MARTIN I. WILBERT,
Care German Hospital,
Philadelphia.

SKIAGRAPHS.

Dr. Mihran K. Kassabian of Philadelphia, Pa., during the first regular meeting of the *Roentgen Society of the United States* (Dec. 13th and 14th, 1900), which was held in Grand Central Palace, New York, exhibited the following skiagraphs numbering more than 150 different actual surgical and medical cases.

(*1*) *Lung cases* (Tubercular 16x20), including every stage of tuberculosis, viz. infilteration, consolidation, both apices, cavities miliary tuberculosis, pleurisy with effusions, lobar pneumonia, and abscess.

(*2*) *Eye cases*, viz., foreign bodies, as a small piece of steel, glass and shot, etc.

Silver canulae in both lacremal ducts (profile and occipito frontal views), gold and glass balls and artifical eyes (after the implantation and *Mile's* operation).

(*3*) *Foreign bodies*, as shots, needles, pins, glass, etc. Shot in the antrum, showing the course of it.

(*4*) The *Kidneys* injected with two different kinds of opaque material, bismuth and plaster of Paris. The veins were injected with the bismuth and the arteries with plaster of Paris, which gave different shadows in the arerial and venus blood supplies of the organ. This is an interesting study from a histological and physiological standpoint.

(*5*) *Vesical and Renal Calculi.* 12 year old boy congenital *imperforated anus*. Bismuth emulsion was injected through a rubber tube passing into the artificial anus. X-ray shows the *size* of the *pouch* and the distance from the lower portion of the rectum (a steel sound was passed into the *sphincter ani* operated and pouch was pulled down and anastomosis made, by excising the coccyx.

(*7*) *Fractures.* (*a*) *Upper extremities*, viz.; phlanges, meta-carpel bones, *Colles;* twenty different varieties. Barton's, and middle and upper third of radius and ulna (some of them were medico-legal cases). Olecronon process of ulna; supra-condyloid, separation of epicondyles, inner-condyles, surgical and anamotical neck of humerus, clavical, scapula spinous process and glenoid cavity.

(*b*) *Lower extremities.* Phalanges, Metatarsal bones; *Pott's*, more than twenty different varieties, viz., longitudinal transverse and oblique of tibia and fibula; patella, several pieces; supra-condyloid or femur, middle of the Femur; Intra extra capsular of the femur.

(*8*) *Head.* Ramus of the inferior max-

American X-Ray Journal rewards its readers.

ilary; fracture of the inner table of the skull (medico-legal case); cervical vertebra.

(9) *Disolcations.* Hip joint; fracture and lateral dislocation of the twelfth dorsal verterbra; wrist: elbow; shoulder; ankle; knee and hip.

(10) Several *pathological* cases, as ostitis, necrosis, and ostio-myilitis, arthritis, and Charcot's joint; and gouty deposits; floating cartilege in knee joint.

Also negatives were on exhibition.

PHOTOTHERAPY IN SURGERY.

BY DR. A. V. MININE.

[Translated from Revue Internationale d' Electrotherupic et de Radiotherapic by Dr. Frank Ring for American X-Ray Journal.]

The author gives a short review of the history of phototherapy, calling attention to its use by the Greeks and Romans, and mentioning Alsus, Galen and Avisenna among its advocates. In antiquity it was used for the treatment of leprosy.

M. Niels R. Finsen, who employs the method of treatment by electric light and concentrated sunlight, is of the opinion that the curative effect of the light must be attributed to chemical rays; he excludes totally the influence of heat-rays in the treatment of lupus.

Since the month of February, 1899, the author has used an incandescent lamp of fifty candle power, provided with a reflector. He maintains the lamp, near to the affected part, but at a distance sufficient for the patient to appreciate only a slight sensation of heat. The seances are repeated on successive days, or every two days, and each seance lasts from ten to fifteen minutes. The succeeding seances may even be prolonged to twenty or twenty-five minutes, but it will then be necessary to use light massage to the part exposed to the electric rays.

A lamp of less force may be used.

The application of electric light as a means of cure has, perhaps, more importance in surgery than in internal medicine. Attention is called to the anæsthesia which may be produced by its use, within a few minutes the anæsthetic force of electric light is very considerable; all the pains occasioned by pleurisy, articular rheumatism, contusions and inflammations of the skin may be ameliorated by its application. It is true that the neuralgias are an exception. It exercises a resorbant power in subcutaneous hemorrhages and exudations.

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THE AMERICAN X-RAY JOURNAL has persistantly urged railroad corporations to provide their surgeons with x-ray apparatus, together with accessories, for the purpose, at least, of avoiding error that is so much used against the company and their doctors. Skiagraphs taken soon as possible after the accident, and again after dressing, and again when the patient is discharged from the care of the company, leaves the record complete. All the language of a sophist or the paraphrase of the skilled council can not bear down the simple argument the truth these pictures make. This method also, is the only just solution of contention between employer and employed. With the facts before each party to the case, clear and unmistakable to both, is it not reasonable to think that litigation would diminish and enmity vanish?

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CONTENTS VOL. 5 NO. 1.

Page.
Roentgen Light Notes, by William Rollins 593
Supplement to Note XLI 593
The Anode Rush 593
The Seehear 594
Seeing and Hearing Your Heart Beat 395
The Girdle 596
Rotary Targets 597
Light Gases 597
On the Equivalent Air Gap 599
Multiple Photography 599
Concave Anodes 600
A Step in the Right Direction of Superlative Radiance, by Dr. Alex. H. Hodgdon 600
High Frequency Currents in Therapeutics, by N. Tesla 602
Difference Between Roentgen and Cathode Rays 603
The Wehnelt Interrupter 603
Potential Gradients in Vacuum Tubes 604
Paying Damages For Prolonging a Patient's Life 605
American Electro-Therapeutic Association .605
$300,000 Art Exhibit 606

CONTENTS VOL. 5 NO. 2.

Page.
The Ill Effects of Roentgen Rays as Demonstrated in a Case as Herewith Reported 609
Treatment of Lupus by Roentgen Rays 610
Can Gallstones be Radiographed? 611
A Badly Treated Fracture 611
Stone in the Kidney 611
Colles' Fracture 612
Bullet in the Pelvis 613
Locating a Bullet or Other Foreign Object in the Human Body, by M. L. Penee, M.S. 614
Visibility of Roentgen Rays 614
Roentgen Rays, by Prof. W. C. Roentgen .. 617
The Energy of Roentgen Rays, by Dr. J. G. MePherson 617
Correction of Normal Divergence and Divergence by Position of the X-Rays, by Heber Robarts, M. D 618
Translations, by Frank Ring, M. D 620

CONTENTS VOL. 5 No. 3.

Page.
The Wehnelt Electrolytic Current Interrupter, by Prof. Elihu Thomson. 623
Electrolysis Induced by Roentgen Tubes .. 627
A Case of Aphasia Due to Traumatism. The Medulla as a Speech Center, by W. F. Roehelle, M. D 628
Currents induced by Roentgen Rays 628
Discussions Before the California Academy of Medicine Case of Lupus 629
A Roentgen Ray Lamp 630
Cardiac Arrythmia Observed by the Roentgen Rays 630
Translations, by Frank Ring, M. D 631
Therapeutic Effcet of the Roentgen Ray .. 631
The Determination of the Size, Shape and Position of the Stomach by Means of the X-Rays 632
X-Ray Examinations in Children 632
Capacity of Poor Conductors 632
Cases Subjected to Roentgen Radiation 632
Chronic Tuberculous Peritonitis Cured by the X-Rays 633
Roentgen Rays in Cutaneous Affections .. 633
Stereopticon Pictures by the X-Rays 633
Units, Measurements and Instruments 634
Radiations 634
Electro-Physics and Magnetism 635
Pressure and X-Ray Ionisation 635

CONTENTS VOL. 5 No 4.

Page.
Excitation of the Crookes Tube by the Static Machine 638
On the Luminosity of the Rare Earths When Heated "in vacuo" by Means of Cathode Rays 639
Diffraction of Roentgen Rays 642
Instantaneous Radiographs 642
Foreign Bodies in the Eyeball Located by X-Rays 644
Roentgen Rays in Dental Surgery 644
Radiography, with Special Reference to Detection of Renal Calculi 645
Potential Gradient at the Anode in Vacuum Tubes 645
Injury from Vacuum Tube 646
Electrostatic Lines of Force 646

X-Rays in the Transactions of the New York Surgical Society.... 617
Electrical Exhibition.... 647
Impersonation.... 617
A New Radio Active Substance.... 617
The Value of the X-Rays in Detecting Small Renal Calculi.... 618
Lost X-Rays.... 618
Photography in Natural Colors.... 618
Electric Discharge in a Magnetic Field.... 648
X-Ray Examinations in Tuberculosis.... 648
Effect of Currents on the Human Body.... 649
Chemical Effect of X-Rays.... 649
Radiography in Pregnancy.... 649
Energy Consumed in Vacuum Tubes.... 649
Application of the Roentgen Ray in the Diagnosis and Treatment of Coxalgia.... 650

CONTENTS VOL. 5 NO. 5.

Wm. H. Meadowcroft.... 652
The Wehnelt Interrupter in X-Ray Work, by Prof. Benj. F. Bailey.... —
Restoring Impaired Screens.... —
Re-enforcing Screens....
A Double Focus X-Ray Tube for the Accurate Localization by Flooroscope or Photographic Plate of Foreign Bodies, by Charles Lester Leonard, A. M., M. D.... —
Neural Dynamics.... —
Visibility of Roentgen Rays....
Lung and Heart Reflexes.... —
Physical and Fluoroscopic Examination of the Thorax.... —
The Electrolytic Interrupter in X-Ray Work....
Luminosity of Rare Earths Produced by Cathode Rays.... —
The Pineal Gland and Sexual Development.... —
Seeing With Dark Light.... —
Bullet Retained in the Heart.... —
Radiography in Large Pleural Effusions.... 669

CONTENTS VOL. 5 NO. 6.

Dr. S. H. Monell.... 670
Static Spark on X-Ray Plate.... 675
Photographs "and Radiographs." Proof of Accuracy Essential to Admission as Evidence. Editorial.... 671
A Tube Holder. Dr. William Rollins.... 676
X-Ray Equipment.... 675
Where Is the Cathode Discharge? Dr. William Rollins.... 676
X-Ray and Renal Calculus.... 678
X-Ray Negation Leads to Positive Diagnosis. Dr. Emory Lanphear.... 678
High Rate Roentgen Tube.... 679
X-Rays in Medical Colleges. Answers to Inquiry. Editorial.... 679
Roentgen Rays in Incipient Tuberculosis.... 686
Transformation of X-Rays.... 689
Roentgen Radiation.... 689

CONTENTS VOL. 6 NO. 1.

Dr. John T. Pitkin.... —
X-Ray Light Tubes.... —
Excitation of The Crooke's Tube by The Static Machine.... —
A Letter—Electrograph.... —
A Fluorescent Lead.... —
Roentgen Rays in Military Surgery.... —
Transformation of X-Rays....
Roentgen Rays in Spina Bifida.... —

CONTENTS VOL. 6 NO. 2.

Dr. Frederick Strange Kolle.... —
Review of an X-Ray Diagnosis....
Dr. F. S. Kolle Review of an X-Ray Diagnosis....
Some Lessons from the Practical Application of the Roentgen Rays to Surgery, by John Hall-Edwards, L.R.C.P., F.R.P.S.. —
Excitation of the Crookes' Tube by the Static Machine by John T. Pitkin, M. D.
Photography in Hospitals and Medical Colleges, by Prof. Joseph F. Smith.... —
Practical Suggestion, by J. Rudis-Jicinsky, A. M., M. D.
A Letter—Simultaneous Fluoroscopy and Radiography, by N. C. Morse, M. D.... —
X-Ray Notes, by Dr. J. Hall-Edwards....
Extraordinary Surgical Feat.... —
Another Surgical Feat.... —
Another Aid to Surgery....
A New Use for Rœntgen-Ray Photography.... —
X-Ray Case Book....
To See Around the Corner

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COLLEGE OF PHYSICIANS
OF PHILADELPHIA

CONTENTS VOL. 6 NO. 3.

Page.
Organization of the Roentgen Society of the United States....723
Roentgen Society of United States....724
Excitation of Crooke's Tube by the Static Machine....726
Editorials....728
Roentgen Society, London....728
Exhibition of Skiagraphs, Report of Cases....729
X-Ray Wins $15,000....731
Epithehoma....731
Broken Neck....735
Radiographer, E. Fleischman....735
Roentgen and Becquerel Rays....735
Another X-Ray Trick....736
Improvised Static X-Ray Machine....737
International Congress of Medical Electrology and Radiology....737
Printing by Roentgen Rays....737

CONTENTS VOL. 7 NO. 1.

Roentgen Society of the United States by Dr. J. Rudis-Jicinsky....741
Excitation of the Crooke's Tube by the Static Machine. Chapter V, by Dr. J. T. Pitkin....742
Radiographs by Dr. Pitkin....712
Excitation of the Crooke's Tube by the Static Machine. Chapter VI, by Dr. J. T. Pitkin....745
Certificate to Dr. Priec....746
Direct Method of Measuring X-Ray Intensities by Dr. F. S. Kolle....747
Roentgen Tube....748
X-Ray Reveals Open Safety Pin in the Rectum by Dr. M. K. Kassabian....748
Congress of International Medical Electrology and Radiology....749
Shall the Specialist Divide the Fee with the General Practitioner by Dr. Emory Lamphear....750
Mechanical Action of Crooke's X-Ray Tube....750
Roentgen Rays....750
Cathode Radiation....751

CONTENTS VOL. 7 NO. 2.

Page.
Roentgen Society of the United States. By Dr. J. Rudis-Jicinsky....753
The Photogram....754
Excitation of the Crooke's Tube by the Static Machine. Chapter VII, by Dr. J. T. Pitkin.
X-Ray Burns. By J. N. Scott, M. D....757
Pro Et Contra. By J. Rudis-Jicinsky, A. M. M. D....758
Static Machine. By Y. M. G. Beard....760
Answers to Inquiries....761
Roentgen Rays for Examining Coal....762
"Archives of the Roentgen Rays....763
Generalized Cathode Rays....765
Becquerel Rays....765
The Roentgen Society, London....765

CONTENTS VOL. 7 No. 3.

Excitation of the Crooke's Tube by the Static Machine. Chapter VIII., by Dr. J. T. Pitkin....766
Therapy of Encephalocele....767
The Pathology of Fracture of the Lower Extremity of the Radius....768
Missouri School for the Blind....769
Negatives Developed in Light....769
Discontinuity of Cathode Radiation....770
Home Made Static Machine....770
Answers to Inquiries....771
The Downfall of the Atomic Theory....772
The Roentgen Rays with Associated Phenomena and Their Application in Dentistry....775
Book Reviews. Fractures....777
Skiagraphic Atlas....778
Biography of X-Ray Literature....778

CONTENTS VOL. 7 No. 4.

Roentgen Society of the United States, by Dr. J. Rudis-Jicinsky....779
One of the Active Rooms in the Laboratory of Nikola Tesla. (Illustrated.)....780
Excitation of ths Crooke's Tube by the Static Machine. (Hysteresis.) By Dr. John T. Pitkin....781
Answers to Inquiries....783
Gunstock Deformity....783

X-Ray as an Irritant, by Dr. Mibran K. Kassabian....784
Bright Green Patches....786
Lost Needles....787
Ankylosed Knee....788
Spectrum of Radium....788
Ionic Conductivity of the Atmosphere....788
Absorption and Ionisation....788
Roentgen Rays....788

CONTENTS VOL. 7 No. 5.

Coming Meeting of the Roentgen Society of the United States....791
The Roentgen Rays with Associated Phenomena and their Application in Dentistry....797
By-Laws of the Roentgen Society of the United States....801
Skiagraphy not Radiagraphy....802

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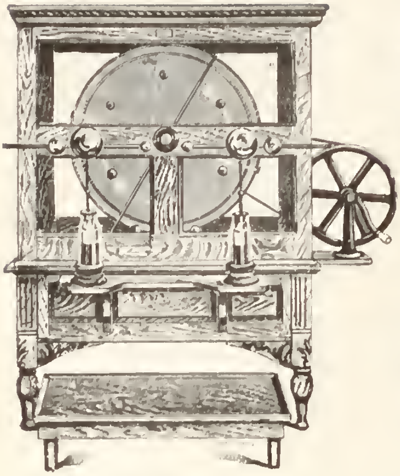

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VOL. 8. *ST. LOUIS, JANUARY, 1901.* *NO. 1.*

CONTENTS VOL. 7 NO. 6.

First Annual Meeting of the Roentgen Society.

President's Address.

X-Ray in Lupus Vulgaris.

The Electrochemic Action of the X-Rays in Tuberculosis.

Skiagraph by Prof. Horner.

Skiagraphs, Description of Same.

Phototherapy in Surgery.

Advice to Railroad Corporations.

Answers to Inquiries.

CONTENTS VOL. 8 NO. 1.

Roentgen Society of the United States. Transactions of the First Annual Meeting.

How to Obtain Detail in the X-Ray Picture.

Dryer for Static Machines.

X-Ray in Bombay.

Dr. G. W. Gould.

Causes from which Men Die.

Lupus Light.

Lukewarmness of the American Medical Association.

Prepared Chalk.

W. A. PRICE, D. D. S.

Member, Roentgen Society of the United States.

2238 Euclid Ave., - - - - - - CLEVELAND, OHIO.

The American X-Ray Journal.

Devoted to Practical X-Ray Work and Allied Arts and Sciences.

VOL. 8. *ST. LOUIS, JANUARY, 1901.* *NO. 1.*

ROENTGEN SOCIETY OF THE UNITED STATES.

TRANSACTIONS OF THE FIRST ANNUAL MEETING, GRAND CENTRAL PALACE, NEW YORK CITY.

DECEMBER 13, 14, 1900.

At 10 a. m. the meeting was called to order by the President. The Secretary read the minutes of the preliminary meeting and the letters from absentees. The report of the Treasurer was then read and was allowed to stand. A letter was then read from Dr. Monell in regard to Standing Committees. The President asked Dr. Monell if he had anything to suggest. Dr. Monell stated that his letter embodied the ideas he had in regard to the matter of Committees; that it seemed to him the four Committees therein mentioned should be appointed. Dr. Waite stated that he knew of no way in which Standardizing could be accomplished save by the experience of each one; that some standard of time should be fixed for taking pictures, and that they should learn to discriminate between the tubes.

Dr. Monell stated that Dr. Waite had presented only the concrete side of the subject; that his written matter handled the whole subject in its entirety; that there was a great deal to the subject of Standardizing, about a dozen branches to it. Dr. Waite was all right as to the difficulty of standardizing one branch. That was a small part of the work needed. Work of a Committee will be very complex, and by the consultation and experiments and investigations and conclusions of a number of men they could certainly reach a good deal of important information on some parts of the subject and that could be condensed and crystallized and put into practical shape. That the simplest beginning was the matter of nomenclature.

The President stated that he understood this paper was to be placed in the hands of a Committee who were to come into touch with each other for the purpose of arranging a standard both of nomenclature and of the method of using the x-ray in diagnosis; Committee to be appointed at this meeting and its reports to be made at some future meeting.

Dr. Monell suggested that the committee be gradually appointed; certainly could not be arranged off-hand; six months work would be a short time to reach any conclusion.

The President suggested that a motion be made for the appointment of a Committee for that purpose.

Dr. Monell's suggestions reread and commented upon.

The President stated that a motion was now in order for the appointment of a Committee on the subject of Standardization, with the understanding that the Committee would not be appointed until after the close of this meeting, in order to give time for the selection of persons who had certain lines of scientific attainment in the line of radiant matter and who were manipulating x-ray machines.

Dr. Girdwood, of Montreal, stated that he fully agreed with the suggestions of Drs. Monell and Waite, and that there was one particular thing which would be advantageous and that was, a standard system of reports. That in each case the name of the tube should be taken with its use, whether it be a coil or static machine, etc. Then there would be, in reporting cases, a standard which could be compared one with the other. Dr. Girdwood then moved that a Committee on Standardization be appointed.

Seconded by Dr. Kassabian of Philadelphia.

Motion carried.

The President quoted from a letter received from Elizabeth Fleischman, a worker in x-rays in San Francisco, who has taken a great deal of interest in this Society, and is a member. She has been employed by the officers of the U. S. Government to do x-ray work on the Pacific Coast. She sent a large collection of her pictures for the Society.

Dr. Monell stated that but one of the four Committees recommended by him had been appointed.

The President stated that the four committees would be named seperately, to transact and do the work of the four objects specified by Dr. Monell, viz: (1) Standardization; (2) Medico-Legal; (3) Committee on Scientific Research; (4) Committee on Ways and Means.

The President stated that the report of the Nominating Committee for officers of the Society for the ensuing year was now in order.

Dr. Price, of Cleveland, O., expressed the desire that this Society, in order to take its place among the scientific societies of the world, must be democratic, and that, therefore, he favored the nominations being made by an informal ballot, rather than by a Nominating Committee.

Dr. Monell stated that the Society was yet too young to be able to pick out its representative men for official positions; that such election should be postponed, and that the entire membership of the Society be requested to send to the Secretary names of those eligible for such offices, and from those names the names having the geatest number of votes or some equally fair plan be selected, and that then a slate be made up and a final choice be made; that though this would take more time, it would be more democratic.

Dr. Swabb, of Brooklyn, asked if the Society was not acting contrary to its Constitution in such action; if the Constitution did not state the election should take place at the annual meeting the notification of members by mail could be done at this meeting. If a change of this sort were made, Dr. Swabb recommended a change in the Constitution.

The President stated that a change in the Constitution was prohibitory for this meeting.

Dr. Price stated that the Constitution does not say that the election should be made at the first session; it could be put off to a later meeting.

At request of Dr. Swabb, the Secretary read Article IV.

The Secretary stated that the present officers were merely elected as preliminary officers for the purpose of organization; that this was the first meeting where an apportunity occured to elect officers. He, therefore, suggested that the election should be held now.

The President stated that he did not hold it legally essential that an election be held to-day under the constitution; that he looked at it merely as a business matter that an election be held to-day. That while Dr. Monell's plan of balloting might be in accord with the ideas of each individual, yet the method of balloting here was confined to the constitution. That in order to carry out Dr. Monell's ideas, a resolution of the Society would have to be adopted to proceed in that way. If Dr. Monell desired to press that point, it might be done by him.

Dr. Mercer, of Syracuse, stated that in his experience as a member of scientific societies, wherever politics were allowed to assume great importance it was detrimental to the scientific interests of the society. That he would like to go in for the simplest possible method, and the nominating system seemed the best. That in every society there were some active and some lagging members and that the laggarts will always say there is a "ring", when it is entirely their own fault. That business should be gotten rid of as soon as possible and the memebrs should devote themselves to the real interests of the Society, its scientific interests, leaving politics in the background.

Dr. Monell stated that his remarks were aimed at eliminating politics as much as possible. That he knew or cared nothing about society politics; that the ideas of the last speaker could not be improved upon, provided that anybody had a list of the ablest and most active men of the society who would take hold.

Dr. Mercer resumed that the people here assembled might know who the best men were, but those who were scattered far and wide who had not attended this meeting did not know. If the matter was delayed for a day or so and the Committee given an opportunity to confer, the Society could trust it to better advantage than it could a miscellaneous vote coming from all over the country. That it mattered not who was President, so only he did his duty.

The President requested an opinion from Dr. Girdwood as to the question of electing officers.

Dr. Girdwood advocated election by ballot of the present officers for the ensuing year.

Dr. Mercer moved that the Secretary cast a ballot for the present officers for the ensuing year.

Seconded.

Dr. Monell stated that such a motion could hardly be carried into effect, as at least one of the officers had resigned.

The President stated that the motion was simply for President. Secretary and Treasurer. He then asked Dr. Girdwood to take the chair and the motion was put.

It was again moved, seconded by Dr. Monell, and carried that the "present President, Secretary and Treasurer, who have so far done the work of organization of the Society be elected for the ensuing year."

The President was called to the chair and stated that the nominations for vice-presidents were now in order.

Dr. Mercer moved that Dr. Girdwood be elected as first Vice President.

Seconded.

Dr. Girdwood deprecated his nomination, stating that there were others present far more eligible than himself.

The motion was carried.

The President stated that the nomination of second vice president was next in order.

It was moved, seconded and carried that Dr. Bender be re-elected second vice president.

The President then stated that it was in order to nominate an assistant secretary.

The Secretary nominated Dr. Price, of Cleveland, O , for this office.

Dr. Mercer seconded the nomination and it was carried.

Dr. Mercer nominated the trustees that were named in the printed circular.

The Secretary announced the resignation of W. C. Fuchs as Trustee.

It was moved by Dr. Mercer, seconded and carried that Dr. Custer, of Dayton, O., be substituted for W. C. Fuchs, resigned, and that the other trustees remain.

Dr. Mercer suggested that a report from the Committee on Revision of the Constitution was most important and should be submitted at this meeting.

The President stated that if such a Committee was here they should get together. The President then raised the question of fixing the place for the next annual meeting.

Dr. Kassabian, of Philadelphia, pleaded the advantages of Philadelphia for a scientific gathering.

Decision on this matter deferred to a later session.

Dr. Taylor, of Cincinnati, moved that the charter be closed, which motion was seconded and carried.

Adjournment for luncheon.

The afternoon session opened at 2 p. m. An address was read by the President outlining briefly the organization of the Society, with some account of Prof. Roentgen, the advantage x-rays has given physicians in diagnosing and the therapy of the x-rays.

Dr. W. A. Florentine, of Saginaw, Mich., read a paper entitled "A Review of Cases of X-Ray Burns."

Dr. Girdwood opened the discussion which ensued, by stating that before discussing the question of x-ray burns, it should be ascertained just what the x-ray itself was. That his friend, Dr. Rutherford, of McGill University, had told him that these rays, the x-rays were really vibratory movements and that the vibrations or waves of those movements were smaller than the supposed size of any atom yet known. If that be true, we would have to give up the atomic theory. That the ordinary sized atoms which chemists are able to contemplate would act as a large sized sieve to these minute rays. That the Roentgen vibrations, according to Dr. Rutherford, are far smaller and far more frequent than the vibrations of sound and light. Thus it was not surprising that the skin, which was most exposed, shonld suffer most from these rays. Dr. Girdwood expressed his approval of the speaker's plan of treatment; stated that he had always used a tube of fairly high vacuum always twelve inches from the patient and had covered the skin with a piece of gold foil. Never had an x-ray burn or any thing approaching to it. That in Montreal the worst cases have been from static machine, despite the claims of that machine that it has not and could not produce x-ray burns.

Dr. Bleyer stated that he had discovered years ago that the x-ray burn was a secondary effect. That the x-ray was applied to the surface of the skin when it was surgically unclean and the burns did not appear at once but a few days after the application of the x-rays the skin began to show certain conditions. These when examined proved to consist of particles of matter. Treating these burns, so to say, consisted of sterilizing the wound itself.

Dr. Kinraide, of Boston, gave his experiences in photography, stating that he had had all the effects of a bad x ray burn without any X-Ray apparatus whatever. That he had also had several x-ray burns and found the best treatment to be a strong solution of bi-carbonate of soda. Took two porcelain jars with a hot saturated solution of bi-carbonate of soda and simply placed his two hands in them and kept them there until the solution cooled. If the burn was not a bad one, vaseline or anything else that would keep the skin soft would be sufficient.

Dr. Florentine stated that in 1,500 exposures he had never had an x-ray burn; that his paper was entirely based on experience of best known x-ray workers of to-day.

Dr. Kinraide in reply to a question from one of the physicians present stated that nitrous acid was produced by the discharge; that he had to make special provisions to take up this acid in some cases; that the burns were not altogether due to the x-ray; the peculiar brown color observed was identical with stains produced by nitrous acid.

Dr. Cunningham stated that he had had severe inflammation of the face and eyes; frequently had to ventilate the room to get rid of the nitric acid. That Prof. Thomson's experiments, as well as others, showed that when the skin was near an x-ray tube currents were present and when a properly grounded screen was placed across, the currents disappeared. Never saw any x-ray burns so long as screens were used. Agreed with Dr. Kinraide in regard to treatment by bi-carbonate of soda; in addition uses a small amount of cocaine.

Dr. Monell and Dr. Kinraide discussed the matter of the effects of the acid being so long delayed, when if you applied an acid to the skin it acted very quickly.

The President stated that the discussion of this paper was of much interest and that probably there would be a committee appointed for the purpose of investigating this and reporting to the next meeting how to get rid of it altogether and including chemistry in their report.

A paper by Dr. William Rollins of Boston, "X-Ray Apparatus for Physicians in the Country". Owing to the abscence of Dr. Rollins this paper was read by the manufacturer of the machines described in the paper.

Dr. Waite said that the paper seemed to be devoted exclusively to exploiting certain apparatus.

The President stated that discussions of this paper must be confined to the direct purpose of the meeting.

Dr. ——— asked if anyone had had an x-ray tube explode. Stated he had never had this experience, but had feared it and wished to know if there was any such danger.

Dr. ——— replied that he had had that experience in the beginning of his work, but thought it due to his carelessness.

Mr. Westbury remarked that in handling something like 5,000 tubes he had never seen one explode unless it was damaged in some way.

Dr. Clapp, of Boston, said that he had had one tube explode in his hand without any apparent cause.

Dr. Custer did not think that tubes explode; condensaton rather than explosion.

Dr. Kassabian stated that he had two tubes inside of four years, one of them exploded while working, couldn't see any fault in it.

The President asked if it was giving radiance at the time.

Dr. Kassabian replied affirmatively.

Dr. ——— said that he had some tubes collapse at the slightest pressure, never had one explode while in use. While the current is passing through it, of course, if you touch a tube it may go into a million pieces. The very slightest pressure will do it under some conditions with a thin tube; tubes used to be much thiner than now. They do not explode; they collapse.

Dr. ——— had noticed it when they were in use. A physician of of St. Louis had one in his hand and it collapsed and filled his eyes. That was when tubes were made very thin. In those cases there was pressure of some kind.

Dr. Monell had had no accidents to speak of with any tube at all. Never had a tube explode. The only punctures taking place under his observation were during handling by a student.

Dr. Girdwood had never had but two accidents, one due to the finger being put on it, and the other punctured by a spark passing over it.

Dr. ——— asked if it might not be due to the fact that tubes were not properly annealed.

Dr. ——— stated that Dr. Jeffrey, of Buffalo, handled the same tube for six months. Last June as he took it from the box it went into a million pieces. He said; "I am through showing x-ray tubes."

Dr. Grover stated that all this goes to prove that tubes do not explode but collapse and the collapse is always due to some cause. He had several tubes collapse and in almost every case the collapse was due to his own carelessness in over-heating the tube.

Dr. Kinraide, of Boston, stated that the tubes were put through the most severe conditions possible in their manufacture. That if they could stand that, they ought to be able to stand almost anything, and if they do burst, it is from no one's fault practically.

The President called upon Dr. Price for a report of his visit to the Paris Exposition in the International Congress of Medicine, Radiology and Electrology.

Dr, Price asked permission to embody that report in his paper.

A paper was read by Dr. J. Rudis Jicinsky written by Dr. Jos. Hoffman, of Vienna, Austria, entitled "X Ray in Lupus Vulgaris."

Dr. Girdwood stated that he had met that morning a friend just returned from England who told him that he had seen in London within the last fortnight the x-rays applied for the treatment of lupus with remarkable results and that he had described the results exactly as did the paper just read; the peculiarity was that the skin was as nearly like the normal skin as possible, which was strange, considering the matter of x-ray burns. His friend also said that he had seen the application of the electric light to destroy microbes in skin diseases and with remarkable good results. He also said that in the use of these tubes they are in the habit of using three tubes, alternating one and the other, and having three patients sitting around these tubes.

The President gave some account of the method introduced by Professor Finsen of Copenhagen using the arc lights in the treatment of these diseases. The Kellogg system of using incandescent lights for the treatment of diseases was shown to be wholly irremdiable. The arc light has curative properties, not the incandescent.

Dr. Buchanan, of Philadelphia, stated that last winter he had had a patient treated with the x-ray in the hospital; that three days after the burn her temperature became normal, respirations regular, etc., but she still has the burn. It is now about the size of a silver dollar. The question is was that disease cured by counter-irritation or by the therapeutic value of the actinic rays. Inclined to think it due to counter-irritation.

Dr. Joseph C. Clark, of Olean, stated that he had a couple of cases to present of lupus. The first case was one of lupus attacking the eye. After the third treatment the lupus on the nose split in two, a good healthy tissue began to appear down the bridge of the nose. At the end of the eleventh treatment, a treatment being given every fourth day of fifteen or twenty minutes, the tube was put within a couple of inches of the face with a lead mask over the face and at the end of the eleventh treatment the lupus had actually disappeared. The next case was one of lupus attacking the left ear, it had eaten away the lobe and had run off on the side of the face, so that it was at least as large as that (indicating). At the end of the third treatment the beautiful baby skin as we call it began to appear. Practically the last treatment yesterday. The only thing that is left is the scar tissue which hardens the ear; but as far as the lupus is concerned, she is well, making two cases successfully treated.

Dr. Towle, of Hartford, has a patient with ulcer on the left temple nndergoing treatment with the x rays. Patient had been to various authorites in New York and Connecticut, some called it lupus, some something else, but under the x-ray treatment a marked improvement was made. Latterly, however, inflamation has set in and the left eye has been affected, so have been a little fearful of continuing with x-ray treatment.

Dr. Waite mentioned the cure of Dr. Sutherland who was expected to die with cancer. Part of his nose was gone. This man was treated for some months, using a lead mask and a low tube about 12 inches away, for about five minutes each day, and the man is perfectly well. Have made it a specialty of treating those cases of lupus with good results, but there have been disastrous results from using the high tube and using tubes too close, destroying the tissue and making very serious ulcerations; but using a low tube 12 inches from the patient and five minutes each day the results have been most gratifying. Should use a lead mask about 1/8 of an inch thick covering the entire face, only a hole punched through, exposing the diseased portion.

Dr. ——— As Dr. Waite mentioned this case was cured by Dr. Chamberlain, of Oakland, California.

Dr. ——— of Cincinnati.—Would like to ask if any of the gentlemen have had experience in treating tuberculosis of the joints. Had a case of tuberculosis of the knee joint. The Doctor was going to amputate, but was induced to delay, to give an opportunity for the trial of the x-rays, and his condition improved so that the opperation was not necessary. Three days after that time he was able to be up and around and now is collecting fares on one of the railroads.

Dr. ——— wished to add one word to Dr. Waite who he considered had struck the key note of the whole thing, i. e., a low tube. Has used one tube for one year and treated cases of lupus without mistakes. Has never had a burn in a year and a half.

"The Electrochemic Action of the x-ray in Tuberculosis" was a paper read by Dr. J. Rudis-Jicinsky of Cedar Rapids, Ia.

Dr. ——— asked Dr. Jicinsky how often he employed those treatments, at what length of time, and if he gave a therapeutic treatment, then an x-ray treatment, then a static treatment.

Dr. Jicinsky replied that he applied the x-ray first then the static.

Dr. Kassabian stated that he had had many tubercular cases. The case can be diagnosed, but whether it can be cured or not with x-rays do not know, according to his experience.

Dr. Monell moves for adjournmen until the evening meeting.

Motion seconded and carried.

Adjournment.

Evening session called to order at 8 p. m. Paper by Dr. J. Mount Bleyer of New York, "Demonstration of the Mount Bleyer Electro-arc Chromolinne for the Treatment of Tuberculosis by Colored Light Rays."

"Skiagraphy in Oral and Dental Surgery," was the subject of a paper read by Dr. Weston A. Price, D. D. S., M. E. of Cleveland, O. This paper was preceded by brief remarks concerning Dr. Price's visit to the Medical Congress of the Paris Exposition. The paper was fully illustrated by the stereoptican.

Dr. Hailes asked Dr. Price if he had never feared the possibility of lockjaw occuring during the use of the x-ray in dental work.

Dr. Price asked a definition of lockjaw.

Dr. Hailes: Due to the growth of a bacillus sometimes found in the mouth, a drum-shaped bacillus. Stated that he had heard of cases of tetanus following the implantation of teeth.

Dr. Price stated that he was glad to have the question raised, but had never heard of a case of lockjaw coming from any operation of dentistry.

Adjourned until Friday morning at 10 a. m.

FRIDAY, DECEMBER 14TH, 1900.

The morning session was called to order at 10 a. m.

The first business before the meeting was the report of the Committee on Revision of the Constitution, represented by Dr. Price.

Dr. Price reported mainly as follows: That the Committee recommended that it be requested to prepare a suitable constitution and by-laws and report in print, the report to be mailed to each member by the Secretary of the Society, together with the notices of the next meeting. That portion of article 5 section 2 of the present Constitution, also article 9, with the exception of the first sentence, the Committee recommended that it be suspended.

It is believed that the organizers had in mind the best and highest development of this good cause. It is believed, however, that it has been unfortunate that certain phraseologies have been put into the Constitution as, for example, Article 9. There is no objection to the AMERICAN X RAY JOURNAL being the official organ of this Society. It should, however, be a business arrangement entirely seperate from the Constitution. The Society should have the privilege of changing the official organ if necessary. The committee on Constitution should also, before sending the report of the next meeting, correspond with such prominent scientists as have not identified hemselves with this Society, find out their reasons for not doing so, and if possible, use such information in the formulation and re-wording of the Constitution. That a Treasurer should be elected and his report should be in detail so that we might know the exact condition of the Treasury and the expenditure of the Society. That the organizers have done their utmost, and the recommendation as to rewording the Constitution has no foundation in feeling on the part of this Committee but proceeds entirely from a desire for the welfare of the Roentgen Society.

Moved by Dr. ——— and seconded that the report be accepted and that those suggestions as made by the last speaker be acted upon.

Dr. Price stated that part of his report required immediate action—the last clause of Section 9 aud one Section in Article 5.

Dr. ——— is asked to amend his motion, and he accordingly moved that the report of the Committee be accepted and that immediate action be taken in accordance with that report upon those clauses of the constitution.

Moved, seconded and carried that the clause referred to by the Chairman of the Committee be changed according to the wording of the report.

The Secretary asked Dr. Price what he referred to about the Treasurer.

Dr. ——— asked if the minutes showed the election of a Treasurer, his idea being that President and Secretary alone had been elected.

The Secretary stated in regard to the expenses and money received he could not give a specified report because he did not know just what specified expenses they were incurring; that it would have to be done afterwards.

The President stated that a nomination was in order for Treasurer.

Dr. Price nominated Dr. Custer for Treasurer of the Society.

Dr. Custer stated that he had already one office, being a trustee in place of Prof. Fuchs, resigned.

Dr. ——— nominates Dr. Florentine, of Saginaw.

Motion seconded and carried.

The President refering to the work of the Secretary stated that he had probably done more work than ten persons, that he had written personally with pen more than 2,000 letters to people in this country and Europe, and that the present gathering was largely the result of his work. That the Local Committee, under Dr. Monell, also deserved the compliments of every person. That Dr. Monell personally deserved the thanks of the Society, and of the exhibitors for the encouragement he has given them for the exhibitions that are made here now are largely due to his personal appeals and visits. That the attention of the Society should be called to the kind services rendered us by the managers of these halls who have greatly reduced their prices and extended the amount of space usually given.

Dr. Price moved that for the present the officers be asked to try and make arrangements with the AMERICAN X-RAY JOURNAL for the publication of the transactions of this meeting.

Dr. ——— For this one meeting? This is asked because the Society may another year publish its own transactions. Seconds the motion.

Motion carried.

Moved by Dr. —— that the Society extend its warm thanks not only to the gentlemen mentioned but to the President as well for the great trouble and expenditure of time that he has given to bringing this meeting to a successful issue.

Seconded and carried.

Dr. Monell moved that the thanks of the Society be extended to the management of the building for their courtesy and their liberality and their spirit of accomodation, they having met every difficulty encourtered and gone far beyond their original agreement and moved that the Society tender its thanks.

Motion seconded and carried.

The Secretary stated that there were many other letters from absentees, and mentioned that Dr. Scott was unable to come and read his paper.

The President read a letter from the Mayor of Buffalo inviting the Society to hold its next annual meeting in that City.

Dr. Clark moved that the invitation be acted upon.

Dr. Waite moved that it be accepted.

Dr. —— moved that the officers of the Association be empowered to select the next place of meeting and to notify the members when they have done so.

Dr. Pitkin plead for Buffalo. Stated that if the members of the Society could look over the grounds of the Pan-American Exposition they would understand his claim. That in electrical line alone millions of dollars would be invested for special development. That Buffalo was proud of its electrical advancement, in the utilizing of Niagara Falls power. That the Electro-Therapeutic Society, as well as other medical societies, were to meet there. The President of the Electro-Therapeutic Society desired that the two meetings be held virtually at the same time, that the same apparatus would be of interest for both. Furthermore, that the railroads would have excursion rates for the Exposition.

Dr. Waite seconded the motion.

Dr. Skinner, of New Haven, moved that the officers of the Society within six months shall give public notice or notice to each member of the Association that they have fixed a place of meeting for the Roentgen Society of the United States.

Dr. Florentine rose to a point of order.

Dr. Waite pleaded again for Buffalo.

The President, owing to the confusion, declared all the motions in regard to this matter annulled.

Dr. Clark moved that the invitation of the Mayor of Buffalo, endorsed by Dr. Pitkin, of Buffalo, be accepted.

Dr. Waite seconded the motion.

Dr. Mercer moved uhat the matter of invitation be left to the officers of the Society who shall decide where the next meeting is to be held. That if they followed the Constitutiou the meeting would be held in December and that was not a suitable time for meeting in Buffalo.

Dr. Clark stated that his motion did not state when the meeting would be held. He would like the Society to decide upon his motion as to whether the invitation should be accepted or not; that he was perfectly willing to leave the time to the officers.

The President stated that the motion as last made would have to carry.

Dr. —— moved that the matter of invitation and our next place of meeting be left to the officers of the Society.

Motion seconded and carried.

The President stated that the officers and committees would decide wholly for the best interests of the Society. That they had spoken of New York as a permanent meeting place, it being the largest city in America and most metropolitan and its opportunities greater. That this Committee of officers would consist of persons widely separated over the United States.

The Secretary mentioned the Committee on Finance.

A paper was then read by Dr. John T. Pitkin, of Buffalo, N. Y., "How to Print the X-ray Picture for Details".

Dr. Mercer asked for information as to the matter of super-imposed plates; said he did not see how good results could be obtained.

Dr. ——— If a multiple coated plate is used all the advantages of the superimposed plates are obtained without any trouble of re-printing. A few years ago in photography there was trouble in taking interiors and landscapes on account of the so called "halo", there always seemed to be a halo around windows and tops of trees. That has been almost corrected by the multiple coated plates. Many kinds of paper on the market; have gotten best results with the so called self-toning paper.

Dr. Pitkin replied that he had embodied these points in his paper, but omitted the paragraph on account of its length.

Dr. Girdwood asks Dr. Pitkin how he manages to get a skiagraph at all, negative or positive, through a double row of glass; have not been able to get any Roentgen rays to pass through two plates of glass. Does not know whether his tube is wrong or the trouble is with the coil, 7 inch coil and 110 volts and 10 amperes put into it. The spark is 7 inches and with that cannot puncture through two layers of glass with the Roentgen rays. Dr. Pitkin says he intensifies with gold solution. This is the old fashioned process of intensifying instantaneous sunlight pictures. He has found that the gold produced a violet colored plate which allowed Roentgen rays to pass almost as readily as the glass does. In regard to multiple printing, his experience shows that paper placed one under the other in layers, probably half a dozen thick, would enable you to get half a dozen pictures or negatives directly at one exposure. They can be printed by the old wax-paper process, using the paper negative as an ordinary negative and printing it by sunshine.

Dr. Waite; Prof. Doremus made some experiments in photographing coins on a dozen plates placed one on top of the other. You can see the pictures at the College of the City of N. Y. The rays of light had gone through the entire dozen plates and made a picture, the last ones were very faint.

Dr. Girdwood stated that he meant getting a practical negative, one that was useful.

Dr. Waite stated that the farthest away would be fainter but you would get some details, that you get a picture through a dozen plates.

Dr. ——— stated that in regard to the coins being photographed between the 12 plates that could be done without the Crookes' tube at all. If the coin is put between the glass and held in the neighborhood of a strong static machine, you will get an impression of the coins every time.

Dr. Waite stated that the coin was placed on top of the entire dozen plates.

Dr. Mercer stated that two years ago a neighbor had sent him four packages of plates. That one package was ordinary plate, the other packages he did not know their condition. These were carefully experimented with and placed in order of efficiency and then sent to the maker. He told me what he had done. It turned out that the efficiency was very decidedly different in these four plates. A plate double coated had the greatest efficiency, single-coated plate the least, a plate simply thickly coated had medium efficiency.

Dr. Price stated that his series of experiments showed that the sensitiveness of the various emulsions to x-ray light was not at all in accordance with their sensitiveness to actinic light from the sun. We cannot always go by the recommendations of manufacturers as to the comparative sensitiveness of these x-rays. Regarding emulsion films, have had a great many made to order varying from 1-4" of thickness of emulsion on the film and it is astonishing the difference it makes when you use three layers of emulsion instead of one. You in that way get the condition that you have in three plates superim posed, but you have all that on one plate so there is no possibility of a shadow or a ray going through the various thicknesses of glass. The printed detail in other words is exquisite, and I recommend very highly the use of these multiple coated plates, but they invariably require slow development.

Dr. Kassabian stated that he had some negatives, if the gentlemen wished to see them.

Dr. ——— stated he had a spectroscopic examination of the x-rays made by Eimer and Amend of N. Y. six months ago in order to find a plate peculiarly sensitive to an x-ray. They were unable to find out just what was necessary to get that result. Has been using for months multiple coated plates. Finds it much better than single emulsion plates. If it were possible to find out exactly what the x-ray was we might succeed in finding a plate specially adapted and thus get better results with our x-ray machines.

Dr. ——— wished to know what the process was of examining the x-ray with the spectroscope.

Dr. ——— Cannot tell; Eimer & Amend made it. They wrote that the result was entirely negative, they could get nothing.

Dr. Kinraid asked if those who had used the triple coated plates had had any trouble with the films.

Dr. Mercer stated he had another difficulty, in warm days, that bugs were a nuisance.

The president stated that the committee on revision of the constitution having not been filled he would add to that committee Dr. A, Clifford Mercer of Syracuse and Dr. Dwight M. Clapp of Boston.

ADJOURNMENT FOR LUNCHEON.

The afternoon session was called to order at 2 p. m. Dr. Price moved that the motion as to election of treasurer should stand. Seconded by Dr. Girdwood and carried.

Dr. Pitkin of Buffalo made a few remarks concerning his paper.

A paper "Technique of the x-ray work" was read by Dr. Mihran K. Kassabian of Philadelphia.

A paper by Dr. J. P. Girdwood of Montreal, "Stereoskiagraphy."

Dr. Mercer begged to differ with Dr. Girdwood about the way of looking at his skiagraphs. If we follow out his thought, when we use both eyes in the ordinary way we see just what we see here; now if we so manipulate the muscles of our eyes to separate this picture into two, we get two images, as in this instance here (indicating); the overlapping picture seen with the right eye is not the one that was taken for the right eye effect but the one that was taken for the left eye effect, and so over here the one that was taken for the left eye effect (indicating) is not the one that is overlapping, it is the one taken with the right eye effect, so that we see with the right eye the left eye pictures and with the left eye the right eye picture. That being true, in order to get the true stereoscopic effect in looking at a picture, you must reverse the mounts, put the right picture on the left side of the mount and vice versa.

Dr. Girdwood, differing with Dr. Mercer suggested that if he took these same two pictures aud put one to the left eye and the other to the right he would have an inverted picture.

Dr. Mercer stated that he saw it the reverse way.

Dr. Monell asked when Dr. Girdwood began his stereoscopic work, and was answered "about two years ago.

Dr. Girdwood stated that he had been taking stereoscopic pictures by ordinary photographic work since about 1850; had experimented with parallel lenses mounted upon the same part of the camera and also with single lenses, taking first one picture, then the other. If you take the pictures with parallel lenses you have to take them apart and transpose them, if with a single lense you do not have to take them apart.

Paper read by Dr. A. H. Schwab of

Brooklyn: "Demonstration of Skiagraphs of Injuries at the Elbow joint, at Time of Injury and the Gradual Repair of Same, Successive Skiagrapes."

Paper "General Observations on Crooks' Tubes" by H. Westbury, of Harrison, N J.

Dr. Price read a paper by Dr. J. M. Scott, of Kansas City, Mo., on "The Development of the X-Ray Plate."

The President stated that, as the time had come for closing he would suggest that a few moments could be well spent in the other room looking at the apparatus there, first asking if any member had anything to say.

Dr. Florentine moved that the Treasurer be voted an honorarium of fifty dollars in recognition of his services in putting the Society upon its feet.

Dr. Girdwood suggested that if the funds of the Society permitted, the amount should be doubled.

As the treasury did not permit of this, the motion was seconded and carried.

The Treasurer thanked the Society for this honorarium.

The President urged united effort in securing new memberships and universal concessions to secure harmony in the Society.

Dr. ——— moved that the members who had reported these surprising cures of tuberculosis cases should keep track of and report to the Society at its next meeting the same cases that had been reported this time.

The Secretary asked that all members of the Society report the results of their cases of pulmonary and other forms of tuberculosis.

Dr. Girdwood then moved that the Society express its appreciation of the faithful work done by the President.

Dr. Mercer seconded the motion.

Carried unanimously.

Dr. Skinner moved adjournment *sine die*.

Adjourned.

EXHIBITS AND EXHIBITORS.

1. Van Houten & Ten Broeck, N, Y., represented by Dr. Mason. Twelve-plate static machine.

Cramer plates and radiagraphs.

2. Detweller Mfg. Co., Buffalo, N. Y.—18 plate Static machine.

3. Electro-Therapeutic Mfg. Co., of Indianapolis, Ind.

4. Queen & Co., of Philadelphia, represented by Mr. Eugene L. Richter.

5. Large Patee static machine. Combined static, galvanic and faradic machine, combination cabinet, galvanic and faradic cabinets and portable batteries.

7. Green & Bauer, Hartford, Connecticut.—Monell X-Ray Tube.

8. Traux, Greene & Co., Chicago.—Crookes' Tubes, Radiagraphs.

9. Universal Electric Stage Lighting Company, of New York.—Chromolinne for treatment of tuberculosis by violet rays of light.

10. Oelling & Heinze, of Boston.—The Heinze Electrolytic Interrupter.

11. General Electric Company, of New York, represented by Mr. Andrews and Mr. Westbury; Edison X-Ray Tubes, transformers, and Thomson Inductorium.

12. Waite & Bartlett, of New York.—12-plate static machine, electrical centrifuge; W. & B., transformer for electric lights.

13. Spring Park Laboratory, T. B. Kinraid, Jamaica Plain, Mass.—Improved Induction coil. Radiographs.

14. Francis E. Jackson, Orange, N. J., represented by Mr. Conkling Barium platino-cyanide fluoroscopes.

15. Swett & Lewis Company, Boston, Mass.—Crookes' tubes.

16. The Kny-Scheerer Co , of New York, represented by Mr. James Fisher.—Adjustable Focus tube and imported (German) tube.

17. Mr. Kassabian, of Philadelphia.—Radiographs.

18 Elizabeth Fleischman, San Francisco, Cal.—Radiograph.

19. Two hundred Radiographs by unknown members.

HOW TO OBTAIN DETAIL IN THE X-RAY PICTURE.

BY JOHN T. PITKIN, M. D., BUFFALO, N. Y.

Read before the first annual meeting of the Roentgen Society of the United States, Grand Central Palace, New York City, Dec. 14, 1900.

Many of the great savants teach us that the rays, emitted by the sun, are magnetic in nature. That the interplanetary space is dark and cold, and when the magnetic force meets with the resistance of our atmosphere, a portion of the sun waves are changed in length, and thereby converted into light and heat, just as the carbon filament in the electric lamp, by its resistance to the current's flow, transforms electrical into luminous and calorific rays.

If we assume that the length, rapidity and nature of vibrations give rise to the different varieties or degrees of force, and that they are, in turn, dependent upon the corresponding activity in the ultimate particles of which matter is composed, then are we able to place all natural phenomena, upon a mechanical and a material basis, and all energy may be looked upon as diversified mechanical activity.

When white light is made to pass through a prism of glass, it is split up into its constituent colors: orange, yellow, green, blue, indigo and violet, which comprise a single octave in the gamut, or scale of mechanical activity, the only octave manifest to the visual organs. Below the red light are found vibrations, which we call heat waves, while at the other extremity, above the violet, are placed the magnetic and the Roentgen rays.

Today we are interested in the violet and ultra-violet vibrations how they, by their actinic power, effect the sensitive plates, films, and papers employed in radiography.

When the halogen salts of silver, chloride, bromide or iodide, incorporated with gelatin or albumen, and spread upon a glass, celluloid, or paper surface and subsequently exposed to an actinic influence, they undergo specific structural changes, which tend to the formation of more stable and less soluble compounds. The extent of the chemical activity, for each portion of the surface, uniformly impregnated, depending upon the quantity of rays arrested, and utilized by the chemical bodies. Again, we are dealing with diversified mechanical activity, for chemistry is the mechanics of molecular construction.

For the proper consideration of the reductional processes, or chemistry, and the technique of ordinary photography, reference to elaborate text-books upon the subject becomes necessary, the present paper dealing only, with a few generalities common to photograpny and radiography, and special methods peculiar to the latter, to be followed in the attainment of contrast or detail, in the printing of the x-ray pictures.

The subject may be conveniently divided into the following arbitrary subdivisions: 1. Exposure of one or more plates. 2. Development and fixation of the latent image. 3. Printing of the skiagraph.

Owing to the penetrating nature of the Roentgen rays, all photographic plates, films and papers, not in use, should be protected from their influence, by keeping them in an iron vault, which may also be used as a dark room. For the rays readily pass through ordinary walls and woodwork of every description, and by setting up chemical action, in the sensitized material, impair its usefulness. A photographic surface thus affected can rarely be made to show detail in the finished picture.

Of equal importance, in this connection, is the absolute exclusion of ordinary light; this may be accomplished by loading a suitable, extra deep, printing frame, by ruby light, in the following manner: One or more recently made photographic plates of medium rapidity, sensitive side outwards, the purpose of extra plates will appear later. On either side of each of the plates, place a heavy piece of blackened cardboard, all to be retained by firm metalic springs, *en situ*.

Wrapping the sensitive plates, in several thicknessess of black paper, may answer the same purpose, but the brittleness of such material, predisposes to cracking, and consequent admission of light, giving rise to diverse shadows, in the finished negative or positive, which have been erroneously interpreted, as various pathological condition.

A pin hole opening, may cause the formation of a small bright spot, or look like the image of a shooting star with an expanded nabular, caudal extremity.

The employment of a strong printing frame, (as recommended), obviates all danger of breakage, from superincumbent weight of a heavy patient.

The patient, apparatus, etc., should be in readiness, and the tube iuactive, when the plate is taken from the iron vault, into the operating room.

If more than one examination, either fluoroscopic, or skiagraphic, is required, each plate must be returned to the iron vault before another is taken out, or the x-ray again employed. When the light is too strong, or continuosly applied, the sub-reductional effects are excessive, and upon chemical manipulation, for the development of the latent image, the whole surface becomes rapidly blackened, by the deposition of elementary silver. If on the other hand, the actinic effect, is too feeble, the dark shadows will form slowly, imperfectly, and cease entirely, before the differentiating deposits, constituting detail can be obtained.

When an optically sensitive surface, is exposed, in the camera obscura, it arrests nearly all of the light, which falls upon its surface. The x-ray plate on the contrary, is effected only by light in transit through its substance, a small portion being arrested, as evinced by its action, upon a secondary plate, or fluoroscope, placed in the background; but several plates, superimposed, may be utilized to obtain all the detail desired, from which a composite picture may be printed.

The intimate mingling of light and dark objects, to be reproduced in the ordinary manner of photography, finds little parallel in radiography, where many of the textures depicted differ from each other, by gradual gradations, hence the more careful manipulation, and employment of the most favorable methods become requisite, to the success of the Photo-Roentgenian.

Development of the latent image. It is advisable to begin with a mild solution of the developer; in it the plate is immersed, (sensitive side uppermost,) gradually intensfying the solution, until the chemical precipitation instrumental in forming the negative picture ceases; no new shadows appear, and those already formed commence to fade away, then the development must be arrested, because further decomposition of the bromide of silver will include that portion not photographically affected, and lesson the contrast, although the process of development of the x-ray picture, is carried a little further, than ordinary negatives.

Fixation is effected by submerging the plate, film upwards, in a bath, freshly prepared, of the hyposulphite of soda, where it should remain for half an hour. During that time, the uneffected silver bromide will be removed, the soluble hyposulphite of sodium and silver passing into solution.

After thorough washing in running water, to remove all traces of hypo, the plate may be rapidly dried by placing a few moments in methylated spirits which will quickly evaporate from the surface.

Intensification, should the negative be thin, or lack in detail, it may be limitedly strengthened, by a toning bath of mercury, gold or platinum in which the elementary silver is replaced by denser metals.

Printing. The developed plate may be inspected by holding it in front of a strong light. The fainter shadows are made mor prominent, by placing a sheet of finely ground glass, (such as is used for focusing in cameras,) back of the negative, or superimposing two or more plates or films from the same exposure.

When a combination is obtained giving the desired effects all may be so placed in the printing frame including the ground glass plate and exposed to diffuse daylight, employing the more feeble violet rays, for its reproduction.

Printing upon albuminized papers, produces pictures upon the surface, showing greater detail, than the mat papers, so much in vogue for portraitures and landscapes, that give a deep seated far away expression to a likeness.

The printing out, or visible methods, with papers sensitized by silver chloride, although slow, yield visible, and more distinct skiagraphs, than the bromide of silver papers, which are very rapid, and produce an invisible image, requiring subsequent development.

Multiple and complex, as are the difficulties which arise on every hand, to those who manipulate this most subtle variety of force (the Roentgen ray) patience, perseverance, and attention to the detail will overcome them all.

To you gentlemen, who have rocked this infantile science, in its cradle, until it has become a lusty child, the whole world owes an everlasting obligation and gratitude which it never! never! willbe able to repay.

The advertising department of the American X-Ray Journal has been heretofore mostly controlled by agencies. As editor I have been unable to forstall in every instance some inimicable advertisements that have mared the otherwise clan pages. With this issue, January 1901 I will personally dictate and be responsible for any such invidious ads.

It is sometimes difficult to draw the line just where right and wrong begin and end. The motives are hard to weigh. But I will weigh them and make firm decision.

DRYER FOR STATIC MACHINES.

Much has been said regarding electric heat as a dryer in the case of a static machine. The practical part is what every operator wants, for the suffering, mental worry and money loss when the machine cannot be used has been the universal experience. The closed case so artistically and magnificently constructed was thought to be sufficient to maintain dryness in these fine machines, but the damper weather found access to the plates. Some hygroscopic substance was necessary and the thoroughly baked chloride of calcium was found to be most efficient. But with this there are three faults: First, the chloride of calcium destroys the lacquer and attacks the metal rods corroding them even to the points of the combs. Secondly; the calcium must be changed, dried, baked and returned to the case, requiring a great deal of care and patience. Thirdly; there are times when this expedient fails, if not wholly, to such a degree that the output of the machine is greatly modified.

These machines have become almost indispensable in the office of the better doctors making it the more necessary that failure should never occur, and that the least inconvenience should attend their use. An electric dryer with large radiating surface has been devised for that purpose. It must not be conceived however that this alone is the goal we seek. But with close observance to what I say the dryer can be used so that the static machine will maintain its charge indefinitely.

If the apparatus is above the first floor in a building heated with radiators and kept constantly warm with windows closed, the electric dryer will keep the machine free from moisture. The dryer should be used for several hours at a time when the output of current weakens. Sometimes it is necessary to let the heat on throughout the night. The heat can be regulated outside the case by observing the dial on the inside of the case that is attached to the dryer. In the heated damp summer months the dryer is the ideal. The weather is hot and the heat in the case drys the machine rapidly. But most machines are in unfavorable situatsons and they should be just as efficient there as any where. The ideal method for all places and for all times, till a better plan is found, is to use in conjunction with the dryer the German granular chloride of calcium. A much smaller quantity is necessay. Instead of using ten pounds use but two or three pounds. Put it in position where you expect it to remain and then fix your dryer in place. Now close the case and if the charge is lost permit the dryer to continue in action until the spark is up to the full capacity of the machine. If for any purpose you must open the case during damp weather you will find that it will require but a few minutes to recharge the apparatus. The dryer may be used at any time the granular chloride shows the least sign of taking up moisture. This will dry the chloride and prevent the machine from ever becoming carroded. You can in this way maintain the evenness of current and constancy of the full electric spark which is not made possible with chloride of calcium alone or by any other known means. The Chloride of calcium does not have to be changed and like the machine is kept dry indefinitely.

X-RAY IN BOMBAY.

Dr. Menchersha Harmisji, Mehrjir a subscriber to the American X-Ray Journal writes us from Bombay India that there is but one static machine in that great city of 500,000 people, and that one is too small for any x-ray work. Neither the science and art of the x-rays or of electro-therapeutics are taught in the medical colleges and the professors, except a very few, are prejudiced against them. He speaks of two medical men one of whom has the best degrees from Europe, have recently become convinced that electro-therapeutics is not a humbug. But the practice is not profitable in Bombay owing to the united effort of the medical profession to disclaim its virtues.

The doctor is looking for a good x-ray machine.

DR. G. W. GOULD.

Commercialism seems to have crept into the editorial department of the Philadelphia Medical Journal to the extent of dislodging its great editor Dr. Geo. W. Gould. We very much regret to see Dr. Gould go out this weekly for he has made it one of the purest professionally and strongest editorially of an medical journal in this country. It has been a great source of pleasure to us to note his willingness and earnestness in giving space to the x-ray science and therapy not seen in any other medical weekly. His mentality in sufficient to grasp the needs of the present, and gleaning from the most recent harvest feeds the useful facts to his numerous readers. He proposes the establishing of a new journal upon new lines of support, which has the appearance of fairness to subscribers and investors. We predict for Dr. Gould greater success than he has heretofore attained.

CAUSES FROM WHICH MEN DIE.

According to life insurance companies the first nine causes of death amongst the men that are insured rank in the order named: Consumption, heart disease, pneumonia, apoplexy, Bright's disease, cancer, typhoid, diseases of the brain and suicide. The greatest mortality is consumption. Since the discovery of the x-rays it is demonstrated beyond question that consumption in its earliest stages can be determined before any other signs are recognized by any of the other known means for diagnosing. The numerous cases of consumption that have been treated by the many operators over the land is conclusive that the x-ray is curing the disease. It is fair to predict that the disease most dreaded and most mortal to the adults of America will within the next decade drop far down in the list of causes from which men die. Cancer is said to be rapidly on the increase in all the higher civilized races. Many of these cancers begin in the skin. It has been demonstrated beyond controversy that these otherwise fatal ailments yield under the influence of the x-rays. This being true it is possible that cancer may fall below the list of nine.

LUPUS LIGHT.

Lupus light is the term now used to express the condition under which light is used for treating diseases of the skin. The apt phrase really grew out of the method of Prof. Finsen in his application of the arc light. The Princess of Wales has recently presented the London Hospital with an arc lamp of 35,000 c. p. More than 40 cases of lupus have been cured by this lamp and according to the Electrical Review of London, Jan. 2d there are now waiting treatment fully 140 patients. It is not the visible rays that effect the cures in these cases but the invisible ones similar to the x-rays in this respect. The x rays are more potent in their action than any light yet devised but require greater knowlenge of technique to properly execute.

LUKEWARMNESS OF THE AMERICAN MEDICAL ASSOCIATION.

A reprint from the *Deutschen Aerzte-Zeitung*, December, 1900, by Dr. Carl Beck, of New York City, consists of a brief synopsis of the meeting of the American Medical Association at Atlantic City. The noticeable feature to us in this classic German reprint is the author's statement "that it was especially observable with what narrow-mindedness the great majority of otherwise bright American colleagues regarded the greatest discovery of this century." It also appears from this interesting account that Dr. Leonard, of Philadelphia Dr. Beck, of New York, and Dr. Kelly were about the only ones that ventured to sing the praises of the Roentgen rays. In the surgical section Dr. Kelly spoke of the surprise to him of the lukewarmness of the American Surgical Association at that meeting, upon this most important subject.

PREPARED CHALK.

Mrs. E. C. Reading of Abiline Tex. writes that she has used prepared chalk for all kinds of burns with remarkable success. She suggest its use in x-ray burns. Her plan is to pulverise the chalk and rub well on the surface.

Grippal Medication Simplified.

The large and increasing number of deaths, especially among our prominent men, due primarily to the prevailing epidemic of LaGrippe, and the serious illness of President McKinley from the same cause, impreases us with the advisability of calling the attention of our readers to the really excellent remedial qualities of the different products of The Antikamnia Chemical Company in the treatment of this scourge and its many insiduous allied diseases. For the purpose of reference, we append a list of their various preparations, viz.:

Antikamnia Tablets
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Laxative Antikamnia and Quinine Tablets.

The last mentioned is a new and without doubt a most desirable combination in the above complaints and also in all malarial and congested conditions.

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We feel that this long delayed action is in the right direction, and will be appreciated by our friends and the trade generally.

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ST. LOUIS, MO.

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THE AMERICAN
X-RAY JOURNAL.

Devoted to Practical X-Ray Work and Allied Arts and Sciences.

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VOL. 8. *ST. LOUIS, FEBRUARY, 1901.* *NO. 2.*

CONTENTS VOL. 8 NO. 1.

Roentgen Society of the United States Transactions of the First Annual Meeting
How to Obtain Detail in the X-Ray Picture.
Dryer for Static Machines.
X-Ray in Bombay.
Dr. G. W. Gould.
Causes from which Men Die.
Lupus Light.
Lukewarmness of the American Medical Association.
Prepared Chalk.

CONTENTS VOL. 8 NO. 2.

Development of the X-Ray Plate.
Review of Cases of X-Ray Burns.
Increased Capacity of the Static Machine.
Roentgen Society—Gold Medal.
Gall Stones Under the X-Rays.
Case of Tissue Injury by X-Ray and Result of Prosecution in Court.
Changing Polarity.
Static in Montreal.
Roentgen Society of London.

E. A. FLORENTINE, M. D.,

Treasurer, Roentgen Society of the United States.

SAGINAW, - - - - - - - MICHIGAN

The American X-Ray Journal.

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THE DEVELOPMENT OF THE X-RAY PLATE.

BY. DR. J. N. SCOTT.

Read before the Roentgen Society of the United States,
Grand Central Palace, New York City,
December 14, 1900.

So much depends on the development of an x-ray plate that every operator should do this part of the work himself. The x-ray plate is the key to the length of all exposures. An assistant or photographer can tell the operator he has over or under exposed his plate but he cannot express to him the degree he has over or under exposed. This is something that cannot be expressed and can only be learned by carefully watching the development of a large number of plates; after also watching action of the tube during exposure.

As to two persons who will measure the same in the diameter through which a radiograph is taken will not require the same exposure with a given intensity of ray, because the density of the flesh and bone in the two persons vary, we cannot guage the exposure by the thickness in a given region, although we can approximate it.

In order to obtain the best picture with a given power of apparatus the exposure must be nearly correct. Through the thin parts we have much more latitude in exposure than the thick and dense ones: for example, with a given intensity of ray we can expose a wrist from five seconds to five minutes and by varying the development, obtain a fairly good negative. In this case one exposure is sixty times the other, but if we vary a hip exposure five minutes we will generally spoil it entirely.

We can rectify mistakes in exposure, by the development much better through the thin parts than thick ones. It is an impossibility to always obtain good radiographs of thick and dense parts on the first exposure, but after making one exposure and developing the plate, a person experienced in exposing and developing plates can nearly always obtain as good a picture as is possible on the second exposure. The following apparatus is essential in the development of x-ray plates:

A dark room, one which is absolutely dark. A room will often appear dark when you first enter, but after a while, light can be seen at different points, this will not do.

A ruby lamp. This may be either an oil lamp, gas or electric light so constructed that no light can escape except through a plate of orange and one of ruby glass. The light should not be of more than three or four candle power. The oil or gaslight can be regulated by turning it down, and the electric light by a rheostat, when using a ten or sixteen candle power lamp.

If a ruby lamp is bought, only a good one should be purchased. If an incandescent lighting circuit is at hand, a box 10 inches high, 4 inches wide and 8 inches broad can be made and painted black. A ruby and orange glass can be sealed in one of the 8 x 10 sides, the top of the box can be made so it can be removed. The top should be grooved so it is right tight, and the electric light can be fastened to the under side of the top.

A small adjustable German silver rheostat should be placed in a handy place so the light can be cut down until it is nearly out. Then the rheostat should be made so no more than a certain amount of light which will not fog the plate, can be turned on. It is impossible to judge by the appearance of the light whether or not your dark room is safe to work in, so to test this, take a plate into the dark room, first being sure it is perfectly dark, then wrap one-half the plate in black paper leaving the other half open, and place the plate near the place it would be during development and turn on your ruby light full strength. Expose it for 15 minutes, then turn out ruby light and develop in the dark for 15 minutes, and then fix in Hypo, and if the plate be clear, the light is all right. If the exposed half of the plate shows a deposit and the other half is clear the lamp is not safe and the light must be cut down until this test shows the whole plate to be clear. If the whole plate is foggy, the fault is in the dark room and must be remedied.

A wooden or hard rubber tank grooved and partitioned to hold the various sized plates you use, for washing this should be so arranged that running water can be kept passing through it while in use. If running water is not at hand, 10 to 15 changes of water can be used, but running water is preferable.

A tank the same size and kind as the one used for washing to hold the Hypo solution.

A hard rubber developing tray for each size of plate used, or a single tray for the largest plate used and this will, of course, hold the smaller ones, but it wastes developer when you develop a small plate in a large tray.

One 8 ounce and one drachm graduate. A rack grooved to hold plates while drying, and if you make your own developer, which is far cheaper than buying it already made up, a pair of scales weighing from 1-2 gram to 2 or 4 ounces. Eight or 16-ounce glass stoppered bottles for developers. Nearly all developers should be kept in small tightly corked bottles as they oxidize and spoil if kept in large bottles only partially filled. It is always preferable to use distilled water in making developers and nothing but pure chemicals should be used. I have several times spoiled developers by using impure chemicals.

Chemicals which lose their water chrystalization should be bought in glass bottles or hermetically sealed cartons of the size wanted for immediate use.

It is very important to have the temperature of all developers while using between 60 and 70° Farenheit. In the summer near 60° and in the winter near 70°.

Ordinary photographic plates can be used in x-ray work, but the specially prepared ones have given me the best results. I prefer a double-coated plate, one with a rapid emulsion on top and a slow one underneath, especially if we wish a contrast. By using a rapid single-coated plate we can obtain plenty of detail but little contrast. Nearly all the older manufacturers of plates put out good x-ray plates. A beginner should select some one brand and kind of plate; use it all the time and not change from one kind to another. All of us can do better work when using a plate we are accustomed to working. If good results are not obtained from the first, do not change to another plate because some one else obtains good negatives with some other kind. This same rule applies to developers.

Select a developer of known worth and use it all the time, because if we change from one to another it will take a long time to decide which one to use, and then more time to learn the technique of using it properly. Always see that your plates are fresh.

A sensitive plate is made of a coating of light sensitive bromide of silver mixed with gelatine and coated on a piece of glass. In order to make a negative the plate must be exposed to the x-ray. Ordinary light will affect a plate but we are only dealing with the x-ray in this article.

In order to protect the plate from other light it is wrapped first in black paper, then in yellow one. A plate holder can be used but the paper is preferable, because by placing the plate on a perfectly flat board, the patient can lay on the plate during exposure, and thus bring the part we wish to take as near the plate as possible. The nearer the plate we place the part to be taken, the sharper the image will be.

When we expose a plate, for example, with a hand on it, we obtain a shadow picture of the hand This picture is invisible to the eye. The appearance of the plate to the eyes is the same before and after exposure, even with a microscope we can detect no difference.

However, when we immerse the plate in a developing solution and fix it in Hypo, the effects of the x ray will appear as a shadow picture of the hand. The reason we obtain a shadow picture is because this plate is effected by different intensities of the x-ray. The hand being composed of different densitities it will cut off more of the ray in some places than others.

We will suppose the hand we are exposing has a shot buried in one of the bones; that another bone is broken and separated, and another with only an infraction. On the part of the plate over which there was no obstruction, the negative will appear very dark and black; when the flesh is interposed it will appear a shade lighter than the unobstructed portion, and we will have an outline of the hand; then the part obstructed by the bones and flesh will be considerably lighter than the part under the flesh, and there will be an outline of the bones distinguished because they are lighter than the flesh. The spot abstructed by the shot will be still lighter than the bones, consequently it can be distinguished whether in the bone or on either side of it. The fracture can be seen because it will let the light through it and the space between the fractured bones will appear darker than the bones. The infraction will appear as a darker line across the bone because at the point of break although it does not extend through the bone, it will have less bone to go through and less of the ray will be cut off than where the bone is whole. If there should be a softening of the bone it would obstruct less light and the negative would appear darker under it. Then if the bone should be thickened at any point, the plate would appear lighter according to the degree.

In printing the finished picture the light places in the negative will print dark and the dark portions light. With a correct exposure the relative densities of the parts taken can be brought out to a fine degree.

Developers are mostly derivatives of the hydro carbon benzine C_2 H_6. Developing solutions consist of the developer proper, an accelerator, a restrainer and a preservative. The developing agents proper are such chemicals as pyro, metol, hydrochomen, etc. These reduce the silver and blacken the shadows. The accelerator is composed of an alkali which increases the power of the developer proper of absorbing oxygen and so accelerates and makes it more active. The alkali most commonly used is carbonate of soda.

Carbonate of potash, caustic soda and aqua ammonia are also used. The preservative is a chemical which will keep the developer from oxidizing when made up in bulk. If the developer is discolored it weakens it and it is liable to stain the film.

Sulph. Soda is the chemical most generally used. It is absolutely necessary to have a neutral Sulph. Soda and one which has not been decomposed by exposure to air. It should be tested before use, and only transparent crystals should be used, as the majority of it on the market is acid. Just as little sulphate of soda should be used in all developers for x ray plates as will prevent their discoloration, because the less that is used the greater will be the printing capacity in the negative of under exposed portions. This property is especially useful in raidiographs of thick parts.

The restrainer which is used nearly universally is Bromide of Potash. Bromide of Soda and Chloride of Sodium can be used. The effect of the bromide is to dissolve some of the bromide of silver out of the film which maks it harder to reduce, and in this way slows its action. In developing x ray plates with any developer, it is advisable to use bromide as it slows development and allows more of the image to come up before the plate becomes fogged.

A detail often neglected in making developers is the use of distilled water, or one free from iron and organic matter.

These impurities spoil many developers which would otherwise be good, so distilled water should always be used if posble. In mixing a developer from a formula, always mix in the order given and follow any special instructions. If a large quantity of developer is made at one time, put it in a number of small bottles and cork tightly. A glass stoppered bottle is preferable and it is better to use no bottle holding more than 16 oz.

The restrainer in the form of 10 per cent sol bromide of potash should always be at hand during development. I never put the restrainer in my developer when mixing it in bulk, but put in the desired quantity when I pour developer in the tray. Many formulas are used for developing plates, but the ones most used in x-ray work are a combination of metol and hydrochinon, pyrogallol known as pyro and rodinal. Pyro is probably the best all-around developer we have, because it gives us great latitude in adapting it to the different effects wanted, such as detail and contrast, but it has its objections. It oxidizes easily and strains whatever it comes in contact with. It will stain the fingers during development unless care is taken.

The following is a formula in common use for pyro developer:

No. 1.	Dist. Water	32 oz.
	Sulph. Soda Crystals	8 oz.
	Pyro	1 oz.
	Water to make	40 oz.
No. 2.	Water	32 oz.
	Carb. Soda Crystals	8 oz.
	Water to make	40 oz.

To develope take of No. 1, 1 oz , of No. 2, 1 oz. and water 8 oz.

In using this formula on a double coated plate with normal exposure, I use 1 oz. each of No. 1 and 1 and 5 oz. water and then add 5 drops 10 per cent sol bromide of potash. By this method I obtain more contrast with plenty of detail.

If the plate is under exposed do not add more alkali to force the development, as in developing regular negatives, because this will make the bones appear veiled, but use a strong developer made by adding less water and about 7 drops of bromide. If the plate is over exposed use about 2 or 3 drops bromide and 7 or 8 oz. water. In the last year I have used the following formula in all my work.

Metol	90 grains.
Hydrochinon	30 "

Dissolve in 24 oz. water and add sulph. soda crystals, 3 oz ; carbonate of soda crystals, 13 drahms; then add sufficient water to make 32 oz. and put in two 16 oz. glass stoppered bottles. For use on a normally exposed double coated plate take 2 oz. developer, 3 oz. water and 1 drahm 10 per cent sol. bromide of potash.

For an under exposure take 2 oz. developer, 2 oz. water and 1 drahm and 10 drops 10 per cent sol. bromide potash.

For over exposure or very large plates 2 oz developer, 4 oz. water and 50 drops 10 per cent sol. bromide potash. Of course the developer must be modified according to the degree of over or under exposure. In metol we have what is known as a soft developer, one giving plenty of detail and softness and in hydrochinon a hard working developer, or one which gives strong contrasts. These are especially required to bring out the bones in negatives of the thick parts of the body and in locating stones in the kidney.

Of course the quantity and penetration of the ray in making the exposures have much to do with the contrasts in a negative, still the bringing out of the detail and contrasts can be greatly helped in development. The larger the quantity of ray given off by a tube with just sufficient penetration to make the proper exposure in a reasonable time will give the most detail and contrast in a negative. The volume of ray given off by a tube depends on the volume of current passed through it and the penetration by the vacuum of the tube and voltage of current passed through it.

In developing the plate it is taken into the dark room with only the ruby lamp for light.

The developer is put in the hard rubber tray. The paper is removed from the plate and the plate is held in one hand with the film side up. In the ruby light the film side gives a dull reflection of the light, while the clear glass side reflects the light more brightly. The tray is held with the other hand and tipped so all the developer all goes to one edge, and the one edge of the plate is put into the lower edge of the tray and then the rest of the plate dropped on the bottom of the tray. The tray is tilted so the opposite edge becomes the lowest. If this motion does not wet all the film immediately we tilt the tray so that it will. Keep the tray rocking gently all the time of development, so the developer is in motion and passing over all the film. As soon as the film side has turned somewhat dark all over, take the plate out of the tray and examine it by holding it about 10 inches in front of the ruby lamp. If the plate still transmits light and has not commenced to turn dark on the back, return to the developer again for a short time, and as soon as the back of the plate turns a little dark on another examination or ceases to transmit light, even if the back has not commenced to darken, it should be taken out of the developer. It should take from 7 to 10 minutes to develope a normally exposed plate. I always use a fresh developer with each plate. If the plate turns dark immediately after immersing it in the developer, showing over exposure, a little more bromide can be added, or more water. When the additions are made take the plate out of the developer and mix with the developer thoroughly as quickly as possible and replace plate. If under exposed, a little more developer may be added, if it does not darken in 15 minutes.

In negatives of thin parts like the hand, the out line will show fairly plain during development but development must not be stopped as soon as the image begins to fade, as with an ordinary negative but continue till the plate has appearance described before.

If the negative is of a thick part like the hip, sometimes the outline of the bones can hardly be made out, but stop developing when it darkens a little on the back or ceases to transmit the light from the ruby lamp. After the plate is developed, rinse for a few minutes in the box for washing plates, put in hypo bath, and cover up so light can not get to it. I use for my hypo. bath with the addition of sulphuric acid to keep the bath clear and prevent staining of the negatives. Formula:

Water	28 oz.
Hypo	8 oz.

Dissolve and mark No. 1.

Water	4 oz.
Sulphite Soda	1 oz.
Chrome Alum	½ oz.
Sulphuric Acid	20 drops

Dissolve and add to No. 1.

The Chrome Alum used in the formula is to prevent the film from softening and frilling. I use the Hypo. solution until it is so weak it will not remove the white from the back of the plate in 15 minutes, then I make up a fresh solution. The plate should be left in the Hypo at least 30 minutes, or for 15 minutes after the back of the plate appears dark. The plate is then washed in running water for at least one hour, as in ten or twelve changes; if running water is not at hand, then put it in the drying rack to dry; it should be left in a draught of air, and it will take about twelve hours in summer to six in winter to dry. If the plate is wanted immediately it can be dried in about one half hour by placing it in front of an electric fan. When a negative has a foggy appearance it is either over exposed, Hypo has been introduced into the developing solution, the developer is too warm or contains too much Carbonate of Soda, too much light in the dark room will also cause it.

Yellow colored negatives are generally caused by using decomposed Sulphite of Soda. Negatives will often be stained yellow or brown by insufficient fixing, also if a plain Hypo. bath is used too many times. Imperfect washing of the negative causes a crystalized appearance and fading of the image.

When a negative is under exposed or under developed, it will have a light appearance inside the outline of the flesh, and when held up to the sun light, the light passes through it readily. When a negative is over exposed or over developed, it is dense and dark all over and little sun light will pass through it. Always wash out the developing tray before and after using it, and let it dry upside down. Never let Hypo. in any form get in the developing tray. After your hands have been in the hypo solution, wash and dry them before touching the tray. If you spill hypo solution on the floor clean it up as when it dries, it will raise with the dust and is liable to get into the developing tray. When I am through developing a plate I drop it into the washing box, wash out my developing tray, and put it in place, upside down. I then take the plate out of the water and put it in the hypo. If I develope several plates one after the other, I wash each, and drop them into the hypo bath without letting my hands touch the hypo, and as a precaution wash my hands after dropping the plate into the hypo.

In hot weather even if you use Chrome Alum in the Hypo. bath, if the developer and Hypo. bath are warm the film will soften and frill. The remedy for this is to use ice in the Hypo. bath, keeping it at about 60° F. and to use a developer at about the same temperture, when ice is added to the Hypo. bath very many times, it dilutes it, and a new bath must be made up.

KANSAS CITY, MO.

The advertising department of the American X-Ray Journal has been heretofore mostly controlled by agencies. As editor I have been unable to forstall in every instance some inimicable advertisements that have marred the otherwise clean pages. With this issue, Febrnary 1901 I will personally dictate and be responsible for any such invidious ads.

It is sometimes difficult to draw the line just where right and wrong begin and end. The motives are hard to weigh. But I will weigh them and make firm decision.

The manufacturers of x-ray apparatus and of x-ray tubes, advertising in the American X Ray Journal can be commended for the superior class of goods offered the profession. We have personally seen the apparatus made by these houses and can safely say that they represent all there is in x-ray and electro-therapeutic apparatus. Buy from them.

Subscribe now for the American X-Ray Journal.

A REVIEW OF CASES OF X-RAY "BURNS."

By E. A. FLORENTINE, M. D.

Read before the Roentgen Society of the United States, Grand Central Palace, New York City December 14, 1900.

Immediately following the discovery of the "x-rays" by Professor Whilhelm Conrad Roentgen, the whole scientific world were impressed with the value of this agent. Crude apparatus were thrown together and every available coil, tube and battery, suitable to such an emergency, was brought into commission.

Physicians, electricians and physicists alike experimented in order that they might satisfactorily demonstrate to themselves the reports of the discoverer.

Following these extensive experiments reports were published showing that "burns" had taken place resulting from the use of "x rays."

This word "burn" being used in connection with the discovery of something new, and as the cause of such results was of mysterious origin, much wild talk and writings were entered upon, which has caused prejudice against the use of the x-rays that time alone will overcome.

Had not the vulgar and incorrect word "burn" been used, probably no such bugbear would have followed. The lay assisted by unscientific press writings added much to stimulate the popular prejudice, but when the matter finally reached the courts the climax seemed to have been reached. A verdict against an unforseen error, resulting from practically an unknown cause would naturally tend to retard the progress of any great discovery.

Among the various subsequent names given this so-called "burn" might be mentioned "X-Ray" Dermatitis, White Gangrene, "X-Ray" Blisters, Electric Burns, and many others.

The depilatory effects were classified as X-Ray Baldness, Alopecia Areata Radiosa and Rentgenosa.

All these terms have their advocates but none prove to be generally accepted, and it yet remains for some scientific genius to coin a name suitable for these injuries.

What constitutes an x-ray "burn?" Any pathological process resulting from the exposure of a part of the body to the x-rays may be termed an x ray "burn."

This process may at first be a mere reddening of the skin and advance to the most aggravative form of ulceration. The progression of the pathological process may be either rapid or slow and may terminate at any time.

Another effect recorded and considered separately by some, is the effect produced which causes the hair to fall out. As the results of this depilotory power of rays is not severe and almost if not always responds to treatment, we will put it under the milder cases of "burns."

The question that now confronts us and is probably the most widely discussed and is studded by both physicians and physicists is the *cause* of these peculiar phenomena manifested when a part of the body has been exposed and "burned" by the x-rays.

Whatever theory we may accept it has been demonstrated that two things will add to the danger of producing these injuries, namely, low vacuum and long exposures. (The tube being near the surface of the body usually less than eight inches.)

In all methods of protection suggested, shields are advocated to intervene between the active tube and part to be exposed. This list covers sheet metals, rubber cloth, oiled silk, grounded screens and many others. All of these apparently have to some extent a protective effect regardless of the fact that "burns" have been produced through all and every safety appliance yet brought upon the market. But as I said before, all of these have a somewhat protective effect. Does it not seem plausible that some of the injurious rays are absorbed in passing through these screens, rendering them harmless. The fact that a low vacuum tube will eminate more dangerous rays than one of a high vacuum would only go to further prove that these protective screens are absorbing or cutting off the dangereus and harmful rays.

In discussing the causes let me quote you a few lines from a certain book on electro-therapeutics: "While it is not yet positively known what causes this injury, it is in all probability due to a bombardment of the tissues by microscopic particles of metal or glass carried off from the metal of the electrodes or the glass of the tube and driven into the tissues by the action of the static charge which they possess." This little extract probably illustrates the theory that is held and defended by many to-day.

The advocates of this theory place implicit faith in the grounded screen and report case after case showing that when the grounded screen is used almost absolute protection is afforded.

When the enthusiasm of this mode of protection was at its height, and many devices were put on market, Prof. Elihu Thomson,, Dr. J. N. Scott and others came forth and showed the fallacy of these theories by reporting actual cases of "burns" resulting from exposures made through a properly grounded screen of aluminum one sixteenth inch in thichness. Prof. Thomson concludes from his series of experiments in the course of which he voluntarily "burned" himself, that "it is well known that x-rays vary in this respect (referring to penetrating power) some being unable to penetrate even moderate thicknesses of tissue, while others penetrate the denser metals with comparative ease. The use of any screen which tends to stop the rays of low penetrating power, and allow those of high penetrating power to pass. is advisable in prolonged use of the ray."

According to this it matters not whether the screen is grounded or not, and as above reports show burns through grounded screens, we will leave the electrostatic disturbance theory to be further discussed by its advocates.

A later and more modern idea of the causes is that it lies in the ray itself and not in some result of its production such as liberating of ozone and above ideas just mentioned; something produced by the rays.

Touching closer to the point we have the actinic rays of the Roentgen rays which have much the same action as the actinic rays of sunlight.

Dr. Pusey summing up this theory says, "And it is no violence to the reason to suppose that the same actinic properties of the x-rays that cause rearrangement of molecules and formation of new salts upon photographic plates can exercise a similar power upon molecular arrangement of tissue calls and influeuce their metabolism." This view is a popular one on what might be known as the actinic theory which in my opinion seems to be gaining friends every day.

Are idiosyncrasies a factor in the causation of these burns? We will consider the idiosyncrasies of persons in regard to drugs, certain modes of treatment etc.

The physician may for years administer certain agents in similar conditions and obtain definite results, when at an unexpected moment some result follows which was entirely unlooked for.

The resistant effect of the skin to the burning rays of the sun varies to the greatest degrees in different individuals; if this be true, why not then the resistant effects of the skin to the burning effects of the x-ray vary in the same extent in individuals, to the degree of no effect at all to a mild or even most dangerous "burn." Furthermore if idiosyncrasies are true of almost all chemical and physical agents why should we draw the line at certain unexpected results that sometimes follow the use of the x-rays?

In discussing the pathological anatomy the degree of the burn must first be considered. The same conditions exist in the corium and subcutaneous tissues that are true of any inflammator y condition of the skin from a mild demratitis up to an alarming stage of necrosis.

The more characteristic and detailed changes may be seen in what is called the trophic changes, and effect the hair and nails. Dermatologists using this agent tell us that baldness may be produced without dermatitis. The conditions present in these cases are thickening of the epidermis and atrophy of the hair follicles, pigmentation due to an increase of eleiden is charactertstic in some cases.

The symptoms present themselves anywhere from a few hours to several months, but usually ten days will be sufficient to bring out any evil effect. Deep seated pain, dull and aching; redness and swelling followed by vesication which ends here or if severe necrosis sets in and sloughing results. These symptoms have a large range of variation, according to the nature of the case. Cases are recorded in which the symptoms of pain was absent throughout the course. The chronic nature of symptoms are also peculiar to themselves.

A peculiar fact is brought out when we consider the complications and diagnosis. The doubt in the result of bone diseases coincident with the use of the x-rays "osteoplastic periostitis," and "ostitis" have been much confused with x-ray in-injuries, and it is a much debated question even to this day as to the real condition of cases that have presumably been wrongly diagnosed in the past.

A case that has been reported to me since I reached this meeting, pertaining to this subject reads as follows:

A patient four months ago shot in left thigh. The second day six exposures were taken with tube close to surface. Seven days later the part became reddened, itching and painful, blisters broke out and it finally terminated in an ulcer. The case was brought to a hospital to be operated on, the resident physicians thinking it was diseased bone caused by a bullet that was causing trouble and possibly the bullet itself that caused the continuation of trouble. The doctor in charge of x-ray apparatus diagnosed it as an x-ray burn and refused to take only one short exposure fearing to only further aggrevate the condition.

Treatment for the burn, consisting of removing the mass of necrosed tissue covering the ulcer was at once persued and the bullet was left alone the result so far to-day shows the case progressing favorably.

Dr. M. K. Kassabian furnished me with a history of a case that shows a peculiar or probably common complication.

A soldier shot in the left knee, bullet embeded. The radiographer removed the bullet. The case two months after showed redness and blisters. The patient said it was almost healed, as before it looked like raw meat. Now the previous treatment in this case consisted of carbolic acid and vaseline applied continuously. The doctor thought it was the carbolic acid that kept it aggravated as it healed up readily under treatment of boric acid in lanolin.

Did you ever consider the effect of phenol when applied to a surface of the skin for a long time? Do you not think that cases of mere hyperemias have been aggravated by this agent? The author has in the last two years experienced some very alarming results by the too heroic use of phenol and different dusting powders.

In the treatment of "burns" there is no rule or set of rules to be laid out and followed. The variance of the "burns" would guide every physician to follow his teachings and use his own judgment as to the best course to pursue in such a condition. Care should be taken not to use too stimulating or any irritating agent that would be liable to cause a continuation of the original trouble.

What might be called the prophylactic

reatment of x-ray "burns" is the kind of treatment with which every worker in this line should best familiarize himself. This consists of using proper precautions in making all examinations. There is no known means of absolute protection, so it is best to use those that have shown some tendency to help the situation. These might be tabulated as follows:

(a) Short exposures. With our present knowledge and improved apparatus we can accomplish the same results in from 1-20 to 1-30 of the time required by using old apparatus. This alone materially reduces the danger of "burning."

(b) Distance between the active tube and part to be exposed to be over eight inches. If we can do our work twenty-five times as fast by our modern apparatus we can increase the distance between tube and body without material loss. The advantage of this increase of distance will add to the sharpness and detail of negative.

(c) In all events avoid exposing a part frequently unless you are using the rays for some therapeutical result, and then the tube should be regulated to your knowledge of effect to be produced.

(d) In cases where much density is to be overcome and the exposure will necessarily be long, use a protective screen impervious to the dangerous rays. While such a screen does not afford an absolute protection as reports show, it certainly helps to some extent.

(e) The vacuum should be as high as required to get best results with shortest exposure. One of the best ways to accomplish this is to have a different tube for each part of the body, especially adapted for that part, or on the other hand a thorough knowledge of operating the self-regulating tube.

In conclusion I might recapitulate, and make one or two additions not brought out as yet:

1st. That injuries were more frequent immediately following the early use of the x-rays than they are now.

2d. That by using proper precautions as mentioned, and efficient apparatus these dangers may be almost entirely avoided.

3d. That it makes no difference whether a Ruhmkorff coil, a Tesla coil or a static machine is used; their improper use invites danger.

4th. That there is needless cause for alarm among the laity, and we should do all in our power to ameliorate this condition by dealing with our patients in an honest and upright manner, and ever wage an active war against all fake exhibitions, quacks and characters that swindle, humbug and misinform the public against one of the greatest and most useful discoveries of the nineteenth century.

Saginaw, Mich.

INCREASED CAPACITY OF THE STATIC MACHINE.

RETALHULEU, GUATEMALA, Jan. 9, 1901.

Dr. Heber Robarts, Editor of the AMERICAN X RAY JOURNAL, St. Louis:

DEAR SIR—Permit me the honor of letting you know that I have increased very much the capacity of the two plates Wimshurst machines by applying to them fan-shaped sectors folded, insulated inside, in order to obtain a large surface for electrical field in a reduced space; just the same like the coils in other kind of machines.

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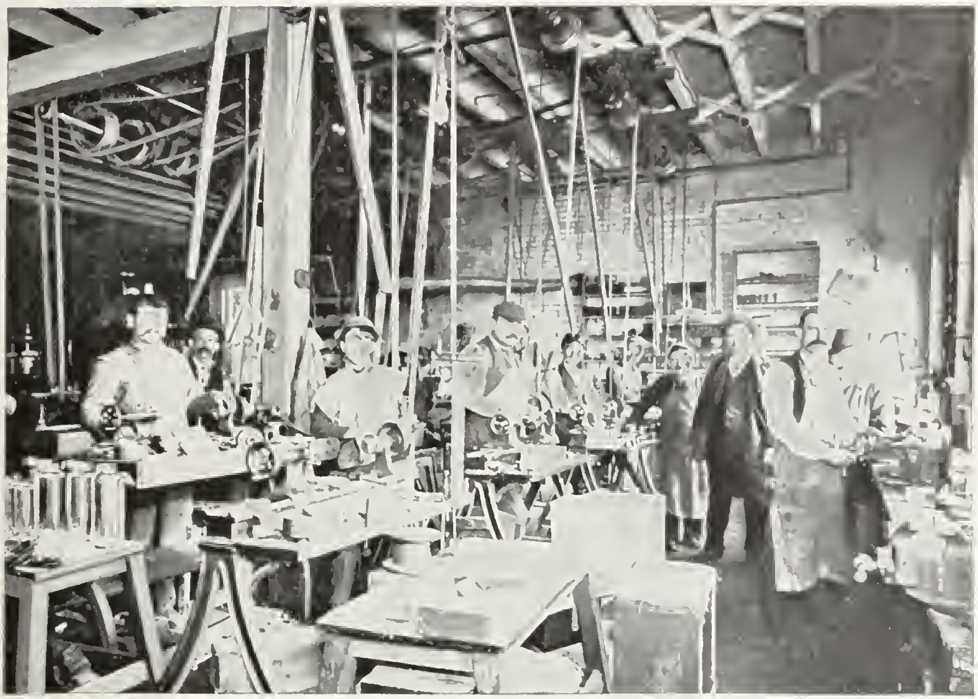
JOSE GALLEGOS.

P. S. I inclose a description of my new system of writing. G.

The editor of the AMERICAN X-RAY JOURNAL will gladly answer any inquiry pertaining to the subject matter of the JOURNAL if accompanied with postage. Hundreds of letters come to us from all over the earth by writers who want some information that in no way pertains to us. Postage must accompany these letters for answer.



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GALL STONES UNDER THE X-RAY.

By J. Rudis—Jicinsky, A. M., M. D., M. E.

Secretary of the Roentgen Society of the United States, Member of the International Congress for Electrology and Radiology, Paris, France; Member American Medical Association, Western Surgical and Gynecological Association, etc.

The progress made in the diagnosis and the treatment of disease has been most marked in nearly every particular. Not only have the therapeutical resources of the physician been greatly enlarged, but new possibilities in diagnosis placed at the disposal of the medical fraternity, which have, to a large extent, changed the methods not only of diagnosis, but the treatment also. Our fathers in medicine and surgery would be astonished to-day to see the fragments of fractured bones, before they are set and then to examine the case afterwards during repair. The means which are offered to the profession for a correct diagnosis are very ample and the x-ray plays surely the predominant part in the hands of a skillful man. A surgeon's responsibility in all his cases is serious and a matter of much interest to the general public, as grave consequences have and continue to result from errors in diagnosis. Why should we not, therefore, to employ such diagnostic means in our cases, which tell us the truth. While I realize my defects every day, as do all doctors who have practiced for many years, yet I will say, that the new means of diagnosis should be understood by all of us. For example, I will relate just one case. This is a case of gall stones diagnosed by different surgeons, of high repute, very differently. One said it was a case of appendicitis, another simple jaundice and still another pronounced the case as incurable or carcinoma of the liver. Such was the diagnosis made in the beginning, later on they all found their mistake and diagnosed the case as hepatic calculi. The patient herself did not care to be operated on; no wonder, when diagnosis was made in such a manner. But finally she gave her consent, if the gall stones could be found with the help of the x-ray. There is no subject which is of greater interest to surgeons and the general practitioner than the early diagnosis of gall stones. And it seems to me, that it is now, in view of advancement in radiology, within the power of the expert to frequently find the gall stones, if they are of mineral constituents, but not those which contain the cholesterine only. The question will now be pertinently asked: How can we most successsully see them and photograph the gall stones? First, we must know our technique, have steady radiance, know our anatomy and generate enough current from our coil or static to have the tube at its best. To properly operate the x-ray we have to study each given case and must think that to turn the switch or turn the handle is not the whole procedure, which the operator has to know about the radiance. Let us state right here, that this nonchalance was the main cause of misrepresentations and many mistakes, attributed falsely to the x-ray. Our shadow—pictures are not alway correct, especially in the hands of those, who as great surgeons think very little about the study of the technique and knowledge, and try to produce "proper" radiance, like a machine from a machine. It is a very simple matter to make good skiagraphs, if you only know how.

Mrs. A. M., a woman of 34, with a history of acute attack of cholecystitis. There was a marked jaundice present. Temperature 100, when the case was sent to me for x-ray examination. Pulse, 120; weight, 101 pounds; height, 5:1; very thin; diagnosis made: Appendicitis, catarrhal jaundice and carcinoma of the liver in the start. Later on pronounced as a case of hepatic calculi. The diagnosis could not be made positive by diluting the stools voided for the day. Following each attack of the hepatic colic, severe pain diverging from the hepatic region, and nausea and vomiting were present, suddenly terminating and followed by slight janndice.

Examination with the x-ray: Fluoroscopic examination negative. Six exposures made, and five were negative, because we had forgotten one main thing: to bring the stones, if they should be present, as near as possible to the photographic plate, covered with tungstate of calcium screen. It is very difficult to find just the length of exposure in these cases. If you do not expose long enough the desired result is not obtanied, and if we expose too long the negative will be foggy and the positive no good at all. In our case the exposure was made at 43 degrees for 50 second only. Tube two and a half feet from the body. Plate right under. The skiagraph of the right side of the body shows the outline of the ribs, vertebrae and pelvis, but not so plain in the print, and two gall stones in the gall bladder, one giving a very dark shadow on account of the phosphates, and the other one, having the nucleus of cholesterine with phosphates around, not so plain.

The presence of gall stones being promptly diagnosticated, the patient was advised not to rely on internal medication any more, because this may delay and thereby complicate any effort in surgical way. The consent for the operation was finally given and cholecystotomy done properly, followed by brilliant and most satisfactory result. Two gall stones were found, their shape aud size corresponding exactly with the shadows in our skiagraph, which was as nearly normal size,as possible.

I recognize the fact that we all will have our successful and unsuccessful periods in managing the x-ray for diagnostic purposes, but I will say, with some degree of modesty, of course, that all those who studied the subject thoroughly, those who, for years, made their experiments in medical electrology and radiology, have to succeed in the near future better than those who, after one failure, will or try to push this means of diagnosis aside. I regard the x ray as the finest product of modern thought, the best means of diagnosis, which should be always tried in every possible case, and every physician and surgeon should be well acquainted with its properties and the proper application of the same. We have seen it in our case, described above, if we would not try and try again, the skiagraph would not have been made and the x-ray would be blamed.

Cedar Rapids, Iowa.

CHANGING POLARITY.

Dr. J. M. G. Beard writes us under date of Feb. 1, 1901, from Fruita, Colo., his method for changing polarity of static machines:

"The method which I shall describe I have never heard of being used by others, and it only applies to machines which have movable Leyden jars. The method is as follows: Set a Leyden jar in contact with either prime conductor and charge it by revolving the plates and separating the sliding-rods, then remove jar, being careful not to discharge it. Give the machine a few turns backward and touch the prime conductors with the hands or a grounded electrode to remove all electricity, then set jar back on machine and in contact with the prime conductor *opposite* the one from which it was taken, start machine into action and the polarity will be changed."

Professor Virgilio Machado, of Lisbon, Portugal, has edited the Portugese Section of the *Exposition Universelle* of 1900, pertaining to radiology and electricity in medicine. The volume is a credit to the eminent author. It is printed on good paper and is freely supplied with good illustrations. It is printed in French.

Begin your subscription to the American X-Ray Journal in Dec., 1900, and obtain all the matter of the Roentgen Society of the United States.

CASE OF TISSUE INJURY BY X-RAY, AND RESULT OF PROSECUTION IN COURT.

By L. A. Perce, M. D. M. E.

The uncertain conclusions held by numerous writers upon the subject, as well as the great interest to me of this my first experience in injuries of x-ray, prompts me to give the full history of this case.

I will state, I had been using the apparatus almost continuously for eight months before this so called burn occurred, without the least sign of skin irritation, as well as since the injury, with still no further influence. I use a Ruhmkorff coil made by the Edison Manufacturing Company, capable of an eleven inch spark. I operate it by the one hundred ten V. current from street circuit. I control my voltage by the use of ten, thirty-two candle power incandescent lamps, placed in series, reinforced by a sliding rheostat. This gives me ample power, and permits of a wide variation, as I may see fit to cut out or use any number of lamps.

On January 20th., 1900, one, A. L. Bancroft, of Los Angeles, came to me with a history of injured right shoulder of eighteen months standing, and wanted a radiograph of the same, stating several physicians said his shoulder was dislocated, and others, said it was not; he stating that when doctors disagreed, who could settle the point except the x ray. I placed him upon the operating table, with coat, vest and suspenders removed, with a plate under right shoulder, a good Biddle tube ten inches from his shoulder, in a five minutes exposure. When my plate was developed, I found it badly fogged. On January 24th., he returned; an exposure of ten minutes given at fourteen inches distance, and no picture obtained. On January 27th., he again returned and I made two exposures, at sixteen inches; one of fifteen minutes and one of twenty-three. This time a fair picture was the result, showing the true condition of shoulder joint.

My subject was a very large, thick chested man, weighing two hundred and twenty pounds. He stated that in about two weeks a bright red spot, some three or four inches in diameter, appeared upon his right breast, above and to the right of the nipple, which later produced a sore andwas hard to heal. He, also, claimed sharp pains ran down his right leg to knee; then below this point to heel, and finally to bottom of foot. Also, his beard on the right side of his face, fell out, but finally returned.

Soon after this, he wrote me, charging me with responsibility in the matter sufficient to warrant him in demanding of me compensation to the amount of three-hundred and fifty dollars. This I at once refused, as I felt I was in no wise to blame, and not wishing to stultify myself and establish a procedure in such a case, I refused to comply with his request for any remuneration whatever. Consequently, his attorney, in July, 1900, began suit against me in the Superior Court of Los Angeles County, for damages to the amount of five thousand dollars. The case came to trial January 14th, and 15th, 1901, and after less than ten minutes deliberation by the jury, they found a verdict in my favor.

Many interesting points were presented during the trial of the case, showing how necessary it would be that one operating with the x-ray, should fully give their subjects to understand accidents had occurred from its use, and others may happen. I took the precaution to advise him that cases had been recorded where it had produced what was called a burn, but I had never seen one. This he corroborated himself upon the witness stand, and Judge Shaw held this to be sufficient warning, even if warning should be required. The plaintiff introduced two witnessess as experts, who directly testified no blame could attach to one operating any kind of a machine for x-ray purposes when ordinary care was employed, such as even far less than I had employed in this case. While no protection such as aluminium plates or any intervening metalic substance was used, I did carefully cover his face and shoulder with clean sterlized towls. Dr. Yoakum, one of their own expert witnesses, stated hə had number of times burned subjects and some in less time, and others in greater or longer exposures. Dr. N. N. Morrison, chief surgeon of the Santa Fee R. R., another of their witnesses, testified he, himself, had submitted to three exposures for diagnostic purposes, of thirty minutes each upon succeeding days, and received a very severe burn of the whole abdomen, and right hip, this to by a man in whom he had, and did still place, the utmost confidence in his skill and knowledge, and in no wise did he consider him, nor his apparatus, to blame. He further expressed himself as a firm believer inthe accumulative theory of the ray as weil as possibly the peculiar condition of the salts of the body in some subjects, making them particularly suseptible to the chemical action or effectss of the ray. His theory was to the effect that nature likes to work in the dark and the smaller blood vessels in particular being disturbed for some minutes by the bright penetrating rays, become disoganized to a degree so that an unhealthy condition was established, which resulted in death of the parts affected. Only one witness saw fit to do all in his power to fasten the blame upon the operator, and he knew nothing of the principle or character of the x-ray, but lays claim to being a skin specialist. His testimony was accepted by the jury as a huge joke, and he left tbe stand weaker than upon taking it.

In my defense, we saw fit to introduce only two witnesses, as our case was made clear by the testimony of these they expected to prove my negligence, carelessness and unskillful application, with which they charged me in their complaint.

In conclusion, permit me to say, that if I have been able in defending myself in this unsought, and uncalled for prosecution, to half establish the fact, that as medical men, we can use, and are willing to use all modern and approved appliances for the purpose of diagnosis, therepeutical effect, among which the x-ray stands prominent, and feel some full degree of security granted and secured by law, I shall feel no regrets from worry of mind, nor financial consideration. There never existed in my mind at any stage of the case the least uncertainty as to the results of the trial of the case.

LONG BEACH, CAL.

The radiograph of gall stone mentioned in Dr. Rudis-Jicinsky's article of this issue is the nearest approach to a perfect picture we have thus far had the pleasure of seeing. It is through this persistent effort on the part of the operator that he has accomplished so much in radiography. Few persons would try six times to produce something that was of doubtful existence and also, if present, had in the great majority of cases the same density as liver structure. Occasionally, constituents of gall stones differ some containing phosphates, and the rays are absorbed sufficient to have the impression upon the plate. In this case the gall stone is very clear, but the surrounding tissues and bony structure is very indistinct.

In the American Journal of Surgery and Gynecology, St.Louis, edited by the master surgeon of the Mississippi Valley, Dr. Emory Lanphear, we are pleased to read a synopsis of the method of removing semi-malignant growths with the electric current and the wide difference in the use of the current for the cure of benign and malignant growths.

Subscribe now for the American X-Ray Journal.

STATIC IN MONTREAL.

MONTREAL, FEB. 10, 1901.

MY DEAR DOCTOR ROBARTS:

I regret exceedingly that I was unable to be present at the first annual meeting of the Roentgen Society of America.

Your excellent journal, however, has given a very full account of the proceedings, and I am glad so eminent a chemist and scientist as my fellow citizen, Dr. Girdwood, has been identified with the work. Subject to correction, I must, however, take exception to a statement attributed to him. Speaking of x-ray tissue destruction (burns so-called) he is reported as saying that in Montreal the worst burns have been from the static machine, and that he never had a burn. I am not aware of any one in Montreal using the static machine habitually except myself. I have a 30-inch 8-plate machine, and have exposed experimentally for an hour at a distance of 8 (eight) inches from the skin, and had a slight erythema following. My tube is a Fessenden specially made for me, and is known as a 20 in. vacuum. I use, and have used, my machine daily for three years, without anything approaching a dermatitis, on all cases, from an infant of twelve months up.

On the other hand, I am informed of two severe burns from the coil in use at a hospital in this city.

Another thing I don't understand is how Dr. Girdwood uses a high vacuum tube with only a seven-inch spark. One of the tubes I use, which I call my medium tube, was discarded at the same hospital as being too high a vacuum for the pressure of their coil (an 8-inch coil).

I should be much interested to hear details of the burns caused by the static machine mentioned.

Lest my remarks might be understood to advocate solely the static machine, I would add that in my experience, the static machine is best for skiascopy, while it cannot approach the coil for certain skiographic effects, and a complete installment, I believe, would embrace both.

Faithfully,
ROBERT WILSON, M. D.

THE ROENTGEN SOCIETY OF LONDON.

At a recent meeting Mr. Isenthal read a paper on "The Progress of Radiography on the Continent." Out of a hundred public institutions on the Continent using the Roentgen rays, only three were satisfied with a 10-in. spark, seven used a 12-in., thirteen a 14-in., forty five a 16-in., thirty a 20-in. and two a 24 in. spark. And on the Continent more attention was paid to the diagnosis of internal disease and injury than was the case in this country. Mr. Isenthal exhibited and described an ingenious form of reclining couch, never before shown in England. On this the patient is laid for examination. Two tubes below give a 12-in. spark, and the shadow of the organ to be examined is projected on a fluorescent screen. By means of a metal pen moving on an arm, it was also possible to make a tracing of the internal organ on a sheet of paper or on the body of the patient. The table was designed for use in cases of heart disease, but could be adapted for the examination of other organs, or to diagnosing diseases of and injuries of the bones.

The Roentgen Society of the United States met here Dec. 13th and 14th in the library of the Grand Central Palace Hotel and had a most successful and interesting meeting.

The x-ray men had come and gone before I knew of it and I am very sorry for our friend Dr. Robarts the x-ray editor of St. Louis was President. I regret that he did not inform me of his meeting. — Medical Mirror, New York City.

We will not forget you at our next meeting, doctor. Join the society that is doing so much for diagnostic medicine and is in line with your advanced thinking.

ACCURACY OF THE X-RAY.

Horsky's discussion of the fallacies of the x-ray hinges largely upon skiagraphs and alleges that they are not entitled to the credence given to ordinary photographs. His reply to inquiry sent to surgeons concerning the status of the x-ray in legal medicine was negative or neutral If the eminent writer and the surgeons he addressed had read the AMERICAN X RAY JOURNAL, and especially volume 5, No. 6, and that article entitled Photographs and Radiographs, he and they would have been long since in the light. It is wholly irrelevant on the part of doctors to discuss this matter, because it is one of the fixtures in radiography that fallacies only follow the untutored or is the result of carelessness. Nothing is more accurate in diagnostic medicine than the x-ray. If you don't know how, read the AMERICAN X-RAY JOURNAL and practice its teachings.

Those who are studying how to round off sentences about the inaccuracies of the x-rays should read the AMERICAN X-RAY JOURNAL and learn how to use the x-rays with accuracy.

Knowledge is a monthly publication, which deserves the confidence of all persons interested in the sciences. The reading matter is clean and high grade, dealing with subjects that interest the thinking mind. It is published in London, England, and founded by Richard A. Proctor.

The *Journal of Physical Therapeutics* has changed from a monthly to a quarterly. It is one of the most interesting of English publications. The January, 1901, number is most instructive. The article by Prof. Finsen on Light Rays appeals to every one devoted to the healing art.

In the March number, next issue, of the AMERICAN X-RAY JOURNAL the four committees will be named that were provided for at the annual meeting of the Roentgen Society of America. Also the next place of meeting of the society will be named. These committees are to fill a place wholly unique new in name and new in service to be given to diagnostic medicine. They will rewrite the literaturo of all that pertains to the x-ray. The functions of this office has been divided into four parts.

Report of a case has recently come from Chattanooga, Tenn., in which is described the location of a 38-caliber bullet, at the posterior base of the cerebrum about 1½ inches from the bony arch. Drs. G. A. Baxter and H. Berlin performed the surgical operation. Prof. W. O. Horner did the x-ray work. Prof. Horner owns the fluorometer and does *not* locate bullets "with inaccuracy."

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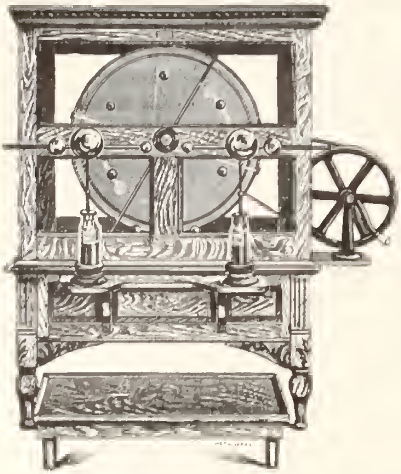

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Devoted to Practical X-Ray Work and Allied Arts and Sciences.

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VOL. 8. ST. LOUIS, MARCH, 1901. NO. 3.

CONTENTS VOL. 8 NO. 2.

Dr. E. A. Florentine.

Development of the X-Ray Plate.

Review of Cases of X-Ray Burns.

Increased Capacity of the Static Machine.

Roentgen Society—Gold Medal.

Gall Stones Under the X-Rays.

Case of Tissue Injury by X-Ray and Result of Prosecution in Court.

Changing Polarity.

Static in Montreal.

Roentgen Society of London.

CONTENTS VOL. 8 NO. 3.

Dr. G. P. Girdwood.

On Stereoskiagraphy.

Stereoscopic Skiagraph of Monster.

Distinction of Gall Stones.

Radiograph, by Dr. Pitkin.

X-Ray Laboratory.

Technique of X-Ray Work.

Stereoscopic Fluoroscope.

Committees.

1. Standardization.
2. Scientific Research.
3. Ways and Means.
4. Medico Legal.

Committee of Arrangements.

DR. G. P. GIRDWOOD,

Vice-President, Roentgen Society of America.

111 University Street, - - - - - MONTREAL, CANADA.

The American X-Ray Journal.

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VOL. 8. ST. LOUIS, MARCH, 1901. NO. 3

ON STEREOSKIAGRAPHY.

By G. P. Girdwood, M. D., Can., M. R. S., Eng., F. R. S. C. F. I. C. &c.

Professor of Chemistry Medical Faculty McGill College Montreal, Consulting Surgeon Montreal General Hospital, late assistant-surgeon Grenadier Guards.

The term stereoskiagraphy implies a shadow picture which gives the appearance of solidity so that every object in the picture stands out in its relative position as regards surrounding objects being made up of the Greek *stereos* solid, *skia* a shadow, and *graphic* a picture and it seems to express what is meant better than the word radiography or stereoradigraphy. A description of the method of taking these pictures is the object of this communication. Stereoscopic vision is due to the fact that we have two eyes placed at a distance of 2 1-2 inches and that each eye sees a different picture from the other. Each eye looking around the near objects as it were and the brain coalesces the two pictures so as to see only one and that one having the appearance of solidity. To produce this result for the surgeon who desires to know the exact position of the foreign body, in any other organism is of the highest importance. This fact came to the author's knowledge in the following manner. A skiagraph was take of a hand of a young woman who was an out patient at hospital, and the skiagraph showed a piece of a needle between the ring and middle fingers. The same young woman had also a needle in the arm of the same side, in position perpendicular to the shaft of the humerus about the middle and running in from the back of arm.

A month after another skiagraph was taken of the same hand when three pieces of needle were found, seen in the interspace between metacarpal bones of middle and ring finger. The attending surgeon realizing an hysterical patient told her if she wished to make a pin-cushion of herself she could do so, but he would not take them out. The surgeon went off duty and another took his place, and seeing the second skiagraph he undertook to remove the fragments. Of course the supposition was that these pieces of needle were in the palmar surface, but when the surgeon came to operate he found them on the dorsum of the hand. From this case the author realized the necessity most urgently of locating more exactly the position of such foreign bodies and having tried various methods of cross wires, rectangular pictures from two points at right angles and remembering the beauty of stereoscopic pictures the author determined to make a stereoscopic picture, and was so pleased with the results that he now always takes his pictures stereoscopically, with the result that the exact location and position of the foreign body is at once made evident.

The manner of taking these skiagraphs is to adjust the tube over the part as near as may be right over the foreign body. The target of the tube is placed parallel to the table on which the plate is laid. The plate wrapped in paper impervious to light is laid on the table, then the part to be skiagraphed. The tube is placed twelve inches above the skin of the part. A plumb ball is held over the part and the tube is brought to such a position that the platinum target is 1 1-4 inches to one side of the plumb line then it is rotated so that a normal to the platinum target will fall on the spot where the plumb ball touches, and a picture is taken. A second plate is slid under the first till in the same position when the first plate is removed. The tube is then moved to a position 1 1-4 inches to the other side of plumb line and the platinum target is so placed that a normal therefrom shall strike the same point of skin as in the previous position, and a second picture is taken. The two pictures will be fac similes of the pictures that would be seen by the two eyes at 12 inchees distance and conveyed on the spot where the point of the plumb bob touched the surface and would give an absolute position. Of all objects seen it will be evident from the pictures here shown that all these objects take their proper relative positions and the distance of one from the other can be readily measured. As these cases often require immediate operation and the surgeon is desirous of rapidly seeing the position of the parts the two pictures may be at once, as soon as fixed, placed in a frame with a ground glass background illuminated and viewed in Wheatstone's reflecting stereoscope which any one can make by obtaining a couple of square pieces of mirror about 4 inches square and fitting them together so as to form a right angle, then by putting the nose opposite the junction, each eye will look into each mirror and if the two pictures just taken as above described be placed at right angle to a line drawn through center of both mirrors and at a distance from each mirror of from 10 to 12 inches the image for each eye will be presented to it and the picture will appear as a solid, every part taking its proper place and relative distance. If it is desired to obtain a print it may be done by taking the negative when wet, just after fixing and washing: a sheet of velox paper or some other developing paper may be moistened and applied to the still wet negative and exposed to gas light or any other light and developed in the ordinary way, and when fixed may be laid on a sheet of glass still wet and put into the stereoscope and viewed. If it be desired to reduce the picture to the ordinary stereoscopic size 2 1-2 to 3 inches square the original negative may be put up in a window with a good white backing and a reduced photograph taken in the ordinary way by camera of each picture. These may be printed either in the ordinary way or by development paper and then mounted on a stereoscopic card mount and viewed in the Brewster refracting stereoscope. In taking and in viewing these pictures and prints it is necessary to be particular in the various processes of copying and printing to bear in mind the various changes of reversal due to the printing and copying. The great advantage of this process to the surgeon is that if he mount the pictures with right eye picture, to the left eye, and the left eye picture to the right, and vice versa, he will be

Uo-to-date doctors do not want any new work on surgery

able to obtain a view of the same object from both back and front so that he may be the better able to judge of the distance of the relative objects.

The Wheatstone's reflecting stereoscope has been described above. The Brewster refracting stereoscope may be easily made by buying a pair of pneumatic lenses which can be bought for about 40 cents and mounting them between two pieces of black cardboard with the board edge to the outside and the thin edges together and the centers of lenses 2 1-2 inches apart, then holding the lenses so that the axis of vision and of lenses should be in the same line and holding the picture at the proper focal distance of the lens a stereoscopic picture will be seen readily by any one whose eyes are of equal power. If, however, the individual is troubled by wearing spectacles it becomes necessary to be careful that the axis of the eye spectacle and lens of stereoscope all be in the same line. In an ordinary case of a needle in the hand the skiagraph only shows the needle lying flat on the same plane as the bones on the paper, but if seen stereoscopically it will often be seen as standing right up in the hand in the very direction in which it has been driven in. In case of monstrosities at birth, where it is desirable to know what is the nature of the skeleton without, or before dissection the whole structure may be ascertained by stereoskiagraphs being taken, and by reversing the pictures both back and front views can be obtained. Specimens of these kind of pictures are here shown and the stereoscope necessary to see them.

As a means of locating objects the stereoscope is far better than any other means. Dr. MacKenzie Davidson, of London, England, has just completed a stereoscopic fluroscope. As yet the author has not seen one but it is claimed for this instrument that the foreign body can be seen distinctly in its proper position and that a probe or knife can be seen exactly in its relative position and that an operation can be readily performed and the point of the knife watched all the the while. If this turn out to be so satisfactory an adjunct to surgery, it will revolutionize surgery.

111 University street, MONTREAL, CANADA.

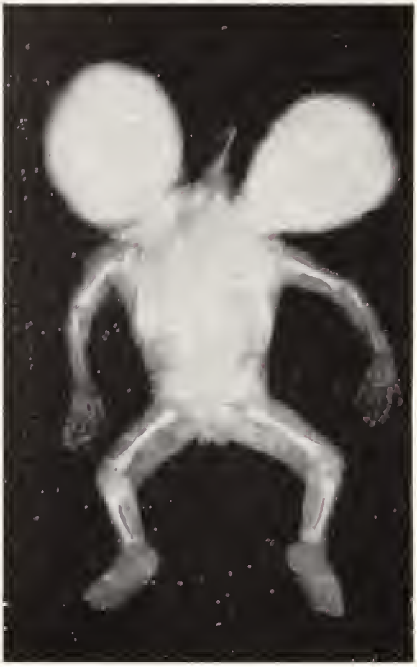
We have recently read from a book review in the Annals of Surgery, "A Manual of Surgical Treatment, by W. Watson Cheyne and F. F. Buyhard." These are the words: "As in the preceding volumes, there is some tendency to dwell too much on certain old-fashioned apparatus and procedures, while some valuable modern methods are either treated too briefly or not at all. Although the x-rays belong properly to a treatise on diagnosis, it is surprising that this adjuvant to treatment fails of mention in this work." We predicted two years ago that any author offering a work without full credit given to the diagnostic advantages of the x-rays would find limited sale and would be classed amongst the rehashings of obsolete literature. A publisher that will put forth a work ignoring the chief tenets of its importance must feed on obloquy.

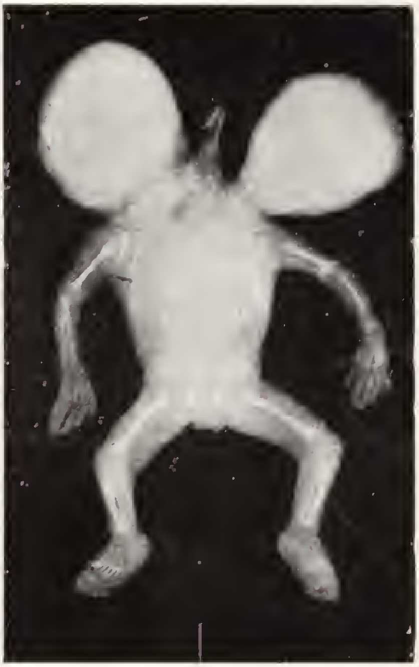
Leonard states without reservation, that stone in the kidney will be affirmed if present and negative upon the photographic plate if absent, provided always, of course, the proper tube is used and the proper radiance obtained. This must sound very strange to those who write so learnedly upon the "fallacies of the x-rays."

STEREOSCOPIC SKIAGRAPH OF MONSTER.

The skiagraph of these monsters was made by Dr. Girwood, of Montreal, and sent to the AMERICAN X-RAY JOURNAL on account of their stereoscopic effect.

The skiagraph is taken stereoscopically, the two pictures being taken from two points 2 1-2 inches apart, and when mounted in one way shows the front view, and when reversed, the back view is seen. Of course, when mounted they are stereoscopic. If mounted one way one picture for right eye and one for left they give a posterior view of the fœtus as if it were walking away with shoulder in the middle, standing well out and the knees bent away from you. If, however, these pictures are reversed the view is from the front and the ribs project toward you and so do the knees.



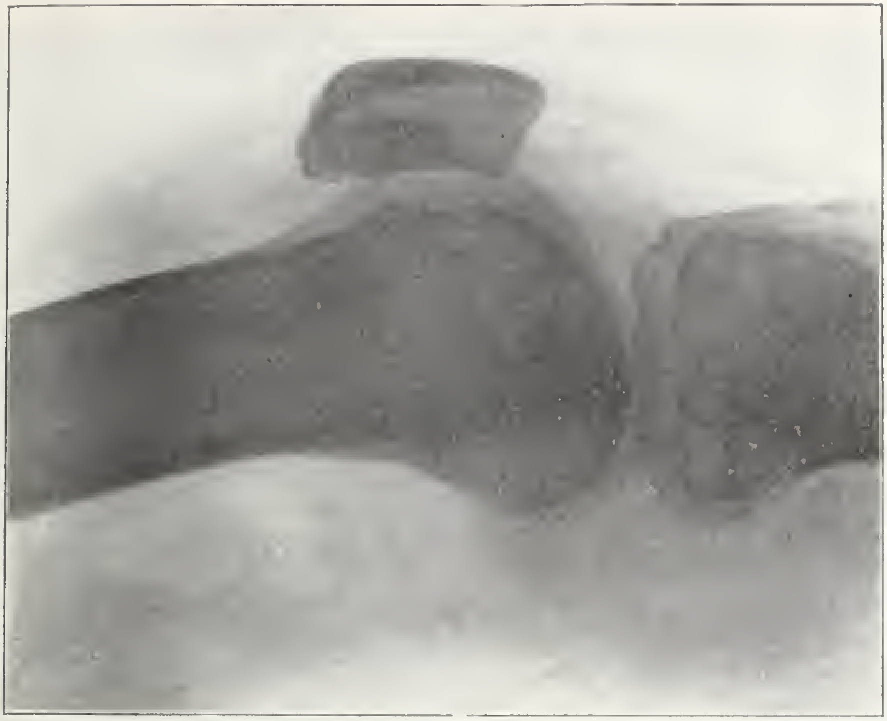


DISTINCTION OF GALL STONES.

The reprint by Dr. Carl Beck, from the New York Medical Journal, "on the detection of Calculi in the Liver and Gall Bladder" together with additional skiagraphs, is a valuable contribution to x-ray literature. Several cases are shown skiagraphically of gall stones in the body. Plates showing different constituents of calculi are very well done. The doctor says: "We distinguish common biliary, pure cholesterin, stratified cholesterin, pure bilirubin, and mixed bilirubin-calcium calculi. The calcium carbonate is also found and gives the greatest distinctness."

Lieutenant F. Brice of the British army read a paper before the Roentgen society of London, 7th ult. on "Experiences of X-Ray Work during the Siege of Ladysmith.

The sage of maturity is always out. The Roentgen Society



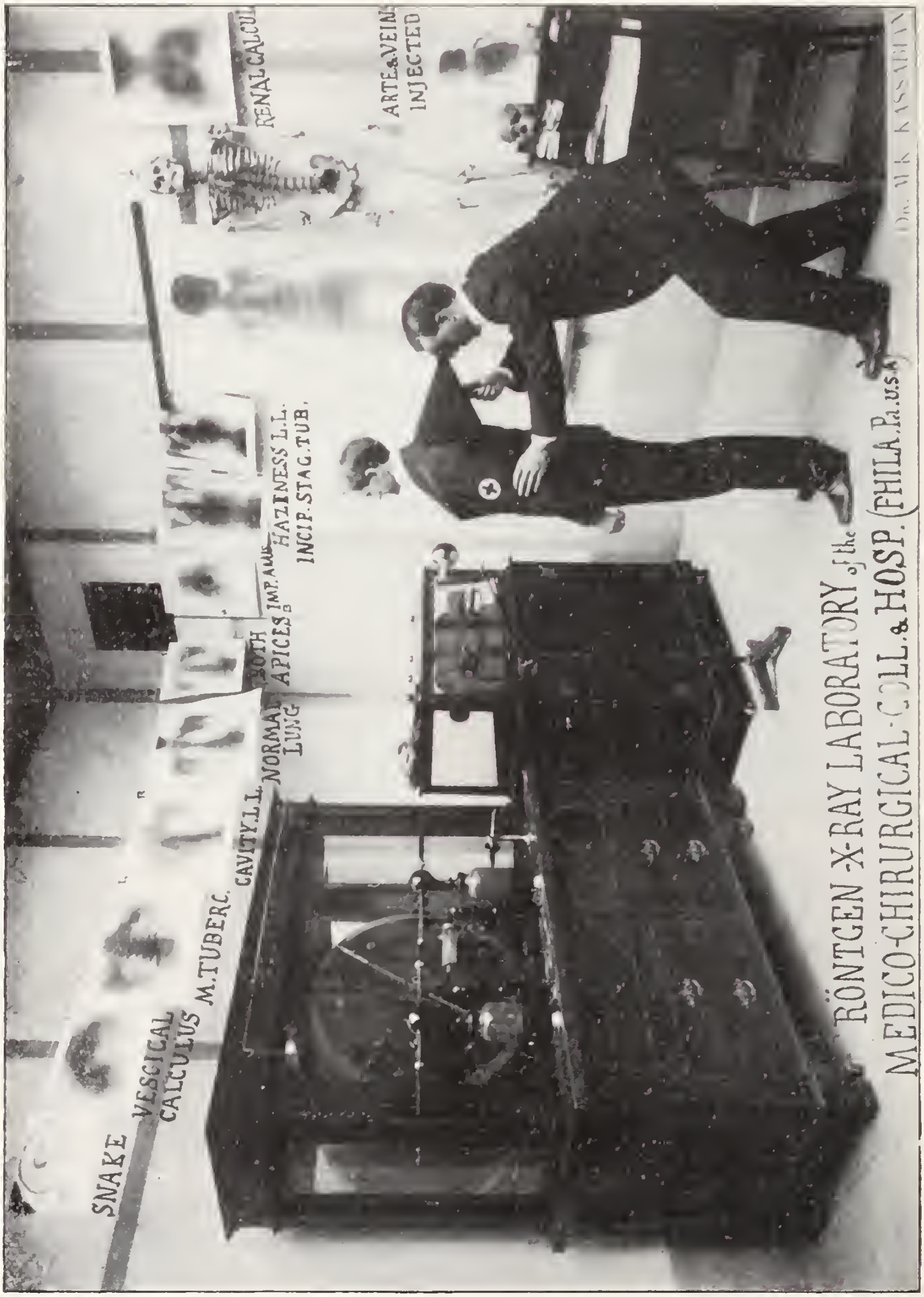
X-Ray Picture of Knee Joint, Taken by Dr Pitkin, of Buffalo, to Demonstrate the Attainment of Detail or Contrast in Modern Radiography. See January Number of this Journal.

STEREOSCOPIC FLUOROSCOPE.

This instrument as described by its maker or inventor, Mr. Makenzie Davidson: "Consists of a fluorescent screen illuminated by two tubes, which are sparked alternately. A rotating disk with appropriately placed slots eclipse each eye alternately. This works synchronously with the sparking of the tubes. Each eye sees the shadow cast by the one tube. A stereoscopic image is thus seen on the screen, the movements of the shutter, etc., being sufficiently rapid to give a continuous illumination of the screen. Those who desire to read up the methods for stereoskiagraphy should study the admirable paper by Dr. Girwood, of Montreal, in the November number, 1900, Vol. 7, No. 5, of the American X-Ray Journal, and also of thisissue. An understanding of stereoskiagraphy makes you acquainted with the principles of the stereoscopic fluoroscope.

The New York Orthopædic Dispensary and Hospital is a worthy charitable institution and deserves the countenance of all philanthropic persons. Their Thirty-Third Year Book is out and is a fair illustrated exponent of the institution. If the same pictured wards, etc., had been substituted for fine x-ray pictures of deformities taken before and after treatment their little folder would have been immeasurably more interesting and useful to every body.

of the United States portends danger to his business.



X-Ray Laboratory, Dr. M. K. Kassabian.

The pessimist sees no room for the Roentgen Society

TECHNIQUE OF X-RAY WORK.

Read before the Roentgen Society of the United States, Grand Central Palace, New York City, Dec 14, 1900.

By Mihran K. Kassabian, M. D.
Skiagrapher to Medico-Chirurgical College and Hospital, Philadelphia, Pa.

Mr. President and Gentlemen:—I feel highly honored in being permitted to read a paper at this first regular meeting of the Roentgen-Ray Society of America, many of whose members have attained world-wide celebrity as specialists in one department of science or another, and in assuming the responsibility of the task I have undertaken, I would have it clearly understood that I am fully conscious of the smallness of my own claims to be heard on a subject so important to the public generally, and to medical practitioners in particular, as x-ray photography has already proved itself to be in the past, and is likely to become in the future. Nor would I have undertaken the task, had I not felt some assurance that the lessons I have learned during a practical experience of eight years in photography, and of several more in skiagraphic work in hospital and United States government service in 1898, may prove serviceable to others also.

Since Prof. Roentgen's famous discovery, I have made more than eight hundred x-ray negatives, and 3000 fluoroscopic examinations, some of which I need hardly say, were failures, but not altogether valueless on that account. In fact, failures in scientific investigations are often the greatest and most efficacious teachers. For a knowledge of what to avoid is frequently of the utmost inportance, especially in work of this character.

In treating the subject of my paper, I shall feel myself under constraint occasionally to enter upon domains of science, where, undoubtedly, many gentlemen present are far more at home than myself. But I trust these little trespasses will be overlooked, and their occurrence viewed as entirely unavoidable.

Need of Experience in Photography.—At the outset I would impress on the x-ray worker the importance of a thorough knowledge of photography, since without that he can hardly hope to succeed in obtaining a satisfactory negative. Moreover, it is very important that he accustom himself to developing his own plates, since if he sends them to a photographer for development, the latter will be liable to under-develope or over-develope them, owing to his ignorance of the case, he does not know exactly what he is aiming at; and besides this the operator does not gain experience as to the time of exposure. And again the patient might be from a distance, so that a quick diagnosis would be of the utmost importance. Few surgeons and physicians can either see or understand anything in an under-exposed- or under-developed negative: and even when the negative is good it requires an experienced eye to take in and appreciate all its details. Hence clearness in the negative is essential to the practical usefulness of skiagraphy in surgery and medicine. And what the negative is, the resulting print must also be.

Fluoroscope versus Skiagraph.—There are two methods of examining a case with the x-rays, both of which are important and useful, yes, necessary since they confirm each other; namely, fluoroscopic and skiagraphic.

It may be noted that there are great diversities of opinion among x-ray workers regarding the relative values

so long as he is holding the hoodwink.

of these two methods. As a matter of fact, however, they both have advantages and disadvantages, which I will endeavor to set forth in detail as results of my own personal experience and observation.

1. The fluoroscopic examination is merely temporary, while the view is limited to few individuals. On the other hand the skiagraph is a permanent record, visible to everybody, and moreover, capable of use in legal cases, the lecture room, clinics, etc.

2. Fluoroscopy, however, is easy, quick and affords ready facilities for comparison with the normal corresponding part. In these respects it has an advantage over the skiagraph, which requires considerable time to effect, and is more tedious.

3. Fluoroscopy also has an advantage when the heart, joints and respiratory movement are concerned; as it offers better opportunities for studying them, and from different directions, when necessary. The skiagraph shows a blurred effect in the case of moving organs.

4. Fluoroscopy is at a disadvantage when the pelvis, kidney, spine and deeper tissues are to be examined; but the skiagraph shows them plainly.

5. A fluoroscopic examination, again, fails to reveal small foreign bodies in the bony part—as shot in the eye, for instance—but the photoplate differentiates by relative density and therefore shows them distinctly.

6. The Fluoroscopic examination shows only indistinctly incipient changes in the bony part (as callus, exudation, floating cartilege in the joints); whereas the skiagraph shows them clearly by differentiation, (provided the vacuum is suitable).

7. In an impacted fracture, also, as there is no displacement or separation, the relative density is unaltered, fluroscopy is of little service; but the skiagraph shows it clearly even through the splint, or plaster of paris, if any is present.

And now, to revert again to the negative, I would direct special attention to a few points of vital importance to success in the effort to secure that clearness of detail which alone determines its practical usefulness.

VACUUM.—It being presumed that the general condition of the x-ray apparatus in use is satisfactory, the operator must see to it that the degree of vacuum he is working with is suitable to the case he has in hand. For fluoroscopic purposes a high degree is usually necessary.

PRELIMINARY FLUOROSCOPY.—All being in readiness, he should first make a fluoroscopic examination of the body or part affected, between which and the focus tube a black screen has been interposed to exclude the surrounding light. This examination must be thorough, since on it depends in great part the success or failure of the subsequent work.

As a case in point, let us take a joint. View it from different directions, and, moving it, compare carefully with the normal corresponding part.

PLATE.—This over, take your plate, and put it into the usual envelope of black paper, making sure that the gelatine side is upward, i. e., toward the smooth side of the envelop. Use a piece of blotting paper or silk to prevent its getting wet from perspiration of the part pressing on it.

POSITION OF PATIENT.—The patient must be placed in such a way as to secure comfort, so that there may be no undue tendency to movement of the part affected during exposure. This

The revolutionizing sway of the x-ray as a diagnostic medium staggers

part, divested of clothing, must be covered with an oiled silk cloth without wrinkles, and brought as near to the plate as possible, an aluminum sheet being interposed and connected with the earth.

In case of foreign bodies in the eye, put the patient in a chair, and use a head-rest, which I find more convenient, and produces less tendency to disturbance of the part either by its own movement, or by ordinary respiration, than if he were reclining.

POSITION OF CROOKE'S TUBE.—The arrangement just spoken of has presumably been made with due regard to the position of the Crooke's tube.

Now it is positively known that the x-rays are both divergent and rectilinear, wherefore even slight carelessness on the part of the operator may cause much distortion and disproportion, or over lapping of bones in the plate. Hence the part to be examined must be placed in the center of the plate; and the platinum disc of the focus tube must be directed to this center, perpendicularly to the center of the hemisphere of x-rays generated.

DISTANCE OF TUBE.—Put the tube as far as possible from the part within a limit of four feet; and remember that the farther the tube, the longer is the time of exposure required, which is somewhat of a disadvantage, but this disadvantage is more than counterbalanced by the increased sharpness of the shadows obtained.

TIME OF EXPOSURE.—As we have just seen, the time of exposure depends on the distance of the tube, but this is only one of several determining causes to be considered. It depends also on the degree of vacuum, and on the resistance met with—as, for instance, the thickness or density of the part to be examined; the presence of splint, plaster of paris, etc.

DARK ROOM.—Assuming then that due care and attention have been given to these details, the next step is to remove the plate to the dark room, which should be located as near as possible to the x-ray room. And there I propose, with your permission, to leave it for a time, while I offer a few remarks on the very important subject of light (solar, white) and photo-chemistry. In doing this I will endeavor to be very concise, and to confine myself to such matters as bear directly on the technique of x-ray work, and are necessary to a clear understanding of the operations it involves.

IMPORTANCE OF A KNOWLEDGE OF PHOTO-CHEMISTRY.—At the close of the 19th century, we no longer believe in empiric formulae, nor do we place a blind, unreasoning faith in the scientific teachings of our ancestors, however eminent they may have been in their day and generation. As physicians, we must know the chemical and physiological action of the remedies we employ or advise. When we prescribe or administer a drug, we must have a clear notion of its most probable effects on the economy and different organs of the body.

Many photographers, undoubtedly, take and develope pictures by a merely mechanical process, with little or no knowledge of the scientific principles on which their art is founded, and by which alone it can be advanced and perpetuated. To such a one, any irregularity in results presents almost insuperable difficulties, which might easily, or at least more certainly and readily be overcome by a knowledge of what is taking place among the chemicals he uses.

In a word, a knowledge of photo-

the surgeon who believes in the "inaccuracies of the x-ray."

chemistry, or the want of it, makes all the difference between the master of his art, who makes his processes the slave of his wishes, and the mere mechanical operator, who is the slave of formulae.

Light.—A knowledge of the nature of light is not of less importance than chemical action to ensure success either in photography or skiagraphy.

In the case of a photograph, the reflection of light from the different objects falls over the sensitive plate in a reversed position; whereas in the skiagraph the shadows fall directly on the plate. We do not know the exact relationship of the so-called x-rays, notwithstanding the many theories which have been broached, but we do know that their action on the photographic sensitive plate is the same.

Action of Light.—A ray of white light has two modes of action, (1), photo-physical and (2), photo-chemical or actinic.

The first calls for merely a passing notice, since it is of little importance in photography. The effects of its chemical action, however, are apparent at every stage of progress in the photographic art; and therefore the cause of such action, and the precise mode of its operation should be diligently sought for.

"In many cases the cause of chemical action may be found in the physical explanation of the nature of light, or radiant energy, the undulations of which it is supposed to consist, exerting their energy in bringing about chemical action, or decomposition."

For our present purpose we may assume this undulating theory, with the chemical theory that bodies are composed of molecules, which are not only themselves in a continual state of oscilatory movement, but whose constituent atoms are also subject to an inter-molecular motion of a similar kind. The principle here involved is that of the superposition of small impulses.

Such impulses repeated at regular and suitable intervals may produce a considerable effect by creating a new molecular and atomic movement in substances resulting in chemical changes.

In fact, when light is absorbed by a body, whether wholly or partially, it must have done work of some kind. In general, perhaps, a rise of temperature results, but in especial cases the effects upon the atoms and molecules may cause them to enter into fresh combinations.

Oxidation and Reduction of Light.—We know from observed cases that the chemical action of light may be that of oxidation or reduction; or it may produce decomposition or photo-dissociation.

The haloid salts of silver are those upon which the action of light is the most important, but it is not yet determined whether this action is one of reduction, or oxidation, or what it is.

Chemistry of Developing Process.—We now proceed to the developing process, in which manipulative skill born of long practice and an intimate knowledge of chemical principles will both be found of service.

It is only in exceptional cases that photo-chemical action of light produces on the sensitive film any visible alteration. The image "photographed" on it is usually invisible, or latent. The light having done its work, means have to be found by which the change in the photo-sensitive plate may be made visible. This process is called "developing," and the agents used in the operation "developers." The action of the developers is in the main chemical, and their varieties are legion, but the chief ones are acid and alkaline.

In alkaline development the image grows by continual reduction of the silver haloid downward, as may be seen by the image only becoming visible towards the end of the operation; consequently, when the silver is removed by acids, a sunken cast of the image is left in the gelatine.

The use of Potassium Bromide as a "restrainer" probably rests upon the the formation of a double salt between it and the silver bromide, this double salt being less reducible than the silver haloids alone.

"The "accelerator" is sodium carbonate, or caustic soda, which act by opening the pores to let the reducing agent into the gelatine.

DEVELOPERS. — I will now explain briefly the various actions and modes of action of the chief agents used in development, although the doing so may involve some little repetition.

The "developers," as has already been explained, are those re-agents which bring out the invisible image by reducing the oxidized haloid silver salts. The alkaline developers play a very important part indeed, owing to the diversity of their modes of action.

REDUCER.—(1) Some of them are reducers, or density givers, as pyro, metol and hydrochinon.

No. 1.				Metric.
Metol.......	½	ounce	=	15.50
Hydrochinon	⅜	"	=	11.65
Sodium Sulphite (crystal)	7½	"	=	233.00
Distilled water....	120	"	=	3600.00
No 2.				cc
Sodium Carbonate (crys)...	4	"	=	15.50
Distilled water............	30	"	=	900.00
				cc

For developing, take four parts of No. 1 and do not add No. 1 in full proportion, viz., one part. But begin with small amount, if necessary, dilute for summer season on large plates, renew the No. 1, if necessary. *Vide* "Modus Operandi of Developing." 10 per cent bromide potash.

ACCELERATORS.—(2) Others are accelerators, which act by opening the pores of the gelatine, thus setting the reducer in action with an energy proportional, within certain limits, to the amount of acceleration, as amonia, sodium carbonate, or caustic soda.

RESTRAINERS.— (3), Others, again, act as restrainers, as potassium bromide, which retards the action of the reducing agent.

PRESERVATIVES—And (4) some act as preservatives as sulphite of soda, or citric or other acid.

PRACTICAL HINTS.—If the operator will observe and carry out the following general rules of procedure, he will seldom fail to attain the end he is aiming at.

1st. To increase the rate of development, use a concentrated developer; increase the proportion of the accelerator, reduce the proportion of the restrainer; and increase the temperature.

2nd. To retard development, dilute the developer, reduce the proportion of the accelerator; and increase the proportion of the restrainer.

3rd. To increase (contrast); reduce the proportion of the accelerator and increase that of the density giver and restrainer; increase hydrochinon.

4th. To reduce (contrast); reduce the proportion of density giver and restrainer; increase that of the accelerator, and dilute the developer.

MODUS OPERANDI OF DEVELOPMENT.—We now come to the detailed process, or *modus operandi* of development, which, of course, is conducted in a room from which all white light has been carefully excluded. A small red light may be used to enable the operator to see what he is doing.

Arrange your developers and accesories in separate bottles, marked 1, 2, 3, etc. Then take tray and measure number 1, (metol) (reducer) into one graduate, and number 2 (accelerator) into another. Then take your plate from the envelope, handling it carefully, and being cautious not to bring it too near the red light. Dust it, and put it into the tray, gelatine side upward, over a plate-lifter. In the case of a large sized plate, it is better to moisten with distilled water, or old developer, to avoid air bubbles, and prevent the patches which may be produced by the strong developer; but for 8x10, or 11x14 size, this precaution is not necessary. It is advisable to use first the old developer, then pour it out, and use the new one, if necessary. Pour number one developer from the graduate glass into the centre of the plate, and rock the tray.

Do not keep too far away from the red light at the beginning, or you will not be able to see whether the developer is being evenly distributed, or is leaving patches. When you notice that it is even, move to a distance of two or three feet from the light, and watch the plate. The time that elapses between the beginning of the developement and the appearance of the picture cannot be definitely fixed, but it is usually ten, twenty or thirty seconds, according to circumstances. You notice first the exposed part of the plate, that is, the part that has not been interposed between the tube and any matter, grows darker and darker; then the muscles or other easily penetrable parts begin to appear in the picture. If it seems to be slow, use a little alkaline by bringing the solution to the corner of the tray and pouring in the alkali (No. II), mix well before rocking the tray. If the picture appears suddenly, use two drops of potassium bromide 10 percent as a restrainer. Do not examine the plate very often by transmitted light, as it may cause fogginess.

The duration of developement depends on several circumstances, as, for instance, the season, or the temrature of the solution or of the room. Development is more rapid in summer than in winter. It is affected also by the part of the body taken, since the thicker and deeper tissue continues until the negative is entirely dark, and opaque in transmitted light, in which case it may be advisable to wash the negative, and renew the developing process.

FIXING.—After the developer has done its work, there still remains a portion of unaltered sensitive salt which must all be removed before the plate is brought into the light. This process is called "fixing", and is effected generally by the use of "Hypo", but sometimes it is advisable to employ "acid fixing". In order to prevent any after-staining or yellow color, it is better to leave the plate in the solution five or ten minutes after it has been apparently fixed. The fixing is followed by washing the plate in running water to remove whatever chemicals may be still adhering to the gelatine film. This final process, like all the previous ones, must be thorough. I find it of assistance while washing to rub the plate gently with absorbent cotton. The patience of the x-ray worker, especially, is sorely tried during this final operation, as he is naturally anxious to learn whatever secrets the plate may have to disclose. The

"Obloquy" will be the one-word epitaph of every

water, however, must be allowed sufficient time to remove the last vestiges of the persistent Hypo from the film. But in this, as in all mundane things, the end comes at last, as we assume it to have come now in the case of our negative.

FAULTS IN THE NEGATIVE CAUSES OF NON-SUCCESS IN PLATE.—Whenever faults, as often happens, are found in the negative after development and fixing, they are generally due to one, or another, or a combination of the several causes enumerated by Mr. Cramer, the manufacturer of photo and x-ray plates, whose long experience in, and through knowledge of photographic work, enables him to speak authoritatively and exhaustively upon the subject. What he says has immediate reference to photographic plates, but with very slight and self-suggestive changes, his remarks are equally applicable to x-ray negatives. These faults with their causes are:

(*a*) *Foggy negatives*, over exposure, white light entering envelope, too much light during development. Fog may also be caused by decomposed developer; introduction of hypo or Nitrate of Silver into the developing solution; developer too warm or containing too much Carbonate of Soda, or Potassium, or Bromide.

(*b*) *Weak negative with clear shadows:* Under development.

(*c*) *Too strong with clear shadows;* Underexposure.

(*d*) *Weak negative with plenty of detail in the shadows:* Over exposure, or too weak developer.

(*e*) *Too much intensity;* Developer excessively strong, or too warm.

(*f*) *Fine transparent lines;* Using too stiff a brush in dusting off the plate.

(*g*) *Round transparent spots;* Air bubbles in developer.

(*h*) *Transparent spots of irregular shape;* Caused by dust. Keep the camera and tablet free from dust, and brush off the plate carefully before placing in the holder (envelope).

(*i*) *Yellow colored negative;* Decomposed pyro solution; insufficient or decomposed sulphite of sodium in developer.

(*k*) *Yellow or brown stains, iridescence of surface;* caused by using the developer warmer or stronger in alkali than the plate will stand: also by plain hypo solution which, by continued use, has assumed a darker color; or by insufficient fixing. The stain may be removed by applying the reducing solution and the iridescent surface can be wiped off with a tuft of cotton while the negative is wet.

(*l*) *Mottled appearance of negative;* Precipitation from the fixing bath containing alum, if the solution is old or turbid.

(*m*) *Crystalization on the negative and fading of image;* Imperfect elimination of the Hypo.

FAULTS RECTIFIED BY (1) REDUCTION.—The remedies for several of the foregoing faults are given in their respective places. the omissions I will endeavor to supply here. The density or darkness due to overexposure or over development may be rectified by using potassium ferrocynide with the Hypo.''

OR (2) INTENSIFICATION.—On the other hand. when the negative is weak, that is, wanting in density due to insufficient deposit of silver caused by under-exposure, or under-development, it requires intensifying or strengthening. The favorite intensifier is mercuric chloride. On covering the wet negative with a solution of this compound, the silver deposit is

surgeon now living who ignores the use of the x-ray.

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OF PHILADELPHIA

bleached, the mercuric chloride being reduced to white mercurous. After washing off the excess of the intensifier, the plate may be treated with a dilute solution of ammonia, which gives black mercurous ammonium chloride, thus adding greatly to the density of the negative.

INTERPRETATION. — The plate is finally dried, and brought into the light. It remains now to interpret it. And the power to do this unerringly results from long experience, aided by such anatomical knowledge as enables the operator to detect at once any abnormal appearance in the part or parts of the body depicted. His further special knowledge may enable him also to comprehend its full significance. The totality of this combined knowledge and experience determines and establishes his position as an x-ray worker. Neither the experienced photographer nor the skilled surgeon or physician can see what he sees in the plate, and what he sees he can show and explain to others by his acquired powers of interpretation. Do not be prompt in diagnosis, study the plate carefully.

PREPARATION OF MATERIALS.—Before closing I would offer a few practical suggestions which may prove serviceable to the inexperienced worker; however superfluous others may think them. In the first place, it is important to remember that the greatest care in the preparation of chemicals and solutions is needed.

Use either distilled water or ice water to avoid impurities, such as carbonates, etc.

It is advisable to use the formulæ of the manufacturer of your plate.

Chemicals must be C. P., such as are prepared for photographic use, and you should know their relative strength.

Bottles must be labeled, and colored bottles light proof, and well corked always. Filter your solutions. Remember in this connection also that cleanliness is paramount.

SELECTION OF PLATES.—I generally use plates manufactured expressly for x-ray purposes. I have tried Eastman's Bromide papers and films, but they do not give satisfactory results. It is advisable to use always the same plate and solutions, when once you are satisfied.

The large skiagraphs (of tubercle lungs, 14x16) which are on exhibition here with the Roentgen Society are made on Carbut's x-ray plates, as are also some of the small ones. But I am now using Cramer's special x-ray plates. They are reliable and give richer details.

PRINTING.—As to the printing, that is quite a simple process, and involves nothing the skiagrapher can claim as special. Moreover, since the negative shows more details than the print contains the latter's value consists chiefly in its greater convenience for handling and for exhibition and class purposes. This being the case, any enlargement on the processes, beyond that enough details should be printed to show the part affected, and that a light print is better than a dark one, would be quite beyond the scope of a paper that is discussing the "technique of x-ray work." And I feel that I have already trespassed too much upon your valuable time. But before concluding, I would like to dwell for a moment on the present conditions and the future possibilities of skiagraphy not with any view to marking their limits, or suggusting their nature, but rather to draw attention to their vastness and their supreme importance to science and humanity. The imagination may be aided to comprehend somewhat of their significance by comparing "small things with great." The "Fathers of Photography," Daguerre and Niepce, Fox and Talbot, in the early days of their great discovery, might have had some dim fore-knowledge of its susceptible development, but their wildest imaginings must have fallen far short of the actual realities a few brief years were destined to divulge.

Its beginnings were limited to portraiture and pictorial representations generally, but the improvements which year by year have been added to its capabilities in this direction, have resulted also in a far wider field of action and usefulness. The naturalist, the physiologist, the archeologist, and even the philologist are to-day employing it extensively as a most useful auxiliary to their studies; while its records and revelations in bacteriology and astronomy are simply invaluable. And the limit of its usefulness is by no means reached.

These are facts worthy the attention of the skiagrapher of to-day, as they may enable him, however vaguely and narrowly, to discern the scope and range of the work he is engaged in. What nobler inducement could be offered to put forth all the care, zeal and intelligence of which he is capable, than x-ray work affords? For skiagraphy is, indeed, the crown and glory of photographic and electric efforts. Therefore, let us strive earnestly, faithfully, diligently and with singleness of purpose, so that, be the visible and tangible results what they may be to us personally, generations of men yet unborn may in time arise to bless our labors, and proclaim their and the world's indebtedness to the early pioneers in x-ray work.

BIBLIOGRAPHY.—Manual on Photography, by A. Brothers; Chemistry of Photography, by R. Meldola, F. R. A. S.; Hints on Development, by Cramer.

1808 Green street, PHILADELPHIA, PA.

COMMITTEES.

Four committees were named at the annual meeting of the Roentgen Society in December and by resolution the president was requested to name the members for these committees as early as practicable. This important matter was brought about by a resolution offered by Dr. Monell. For this reason Dr. S. H. Monell, 47 West 27th street, New York City, is named chairman of the "Committee on Standards." The importance of this work and the burden of labor being so heavy for this committee, I have asked Dr. Monell to name four associates, or six if desirable. Dr. G. P. Girdwood, Montreal, Canada, 111 University street, W. A. Price, D. D. S., Cleveland, Ohio, 2238 Euclid avenue, have already been named. In this connection I will ask of the journal readers to write to Prof. Monell offering opinions and suggestions. You are interested in the Society and in x-ray work and I trust you will feel it is your duty to write offering some opinion, limited howsoever, it may be. Write some opinion.

Committee on Scientific Research is the second committee:

Chairman: Dr. John B. Murphy, Chicago, Ill., 3305 Michigan avenue.

Dr. A. Schwab, Brooklyn, N. Y., 690 Bushwick avenue.

Prof. Elihu Thomson, Lynn, Mass.

Mr. H. Westburry, Harrison, N. J.

Mr. Nikola Telsa, New York City, 46 & 48 East Houston street.

Dr. A. Clifford, Mercer, Syracuse,

N. Y., 324 Montgomery street.

Prof. Elmer Gates, Laboratory, Chevy Chase, Md.

By early co-operation, by writing or otherwise, you can quickly reach points of understanding and congeal into a common whole the result of your labor.

Committee on Ways and Means is the third committee:

Chairman: Dr. J. Rudis-Jicinsky, Cedar Rapids, Iowa.

Dr. Thomas M. Buckley, Brooklyn, N. Y.

Dr. William Jordan Taylor, Cincinnati Hospital, Cincinnati, Ohio.

Dr. William Hailes, Albany, N. Y.

Dr. William Sprenger, New Haven, Conn.

Your labor must be concentrated rapidly as possible and will partake of some of the work of other committees, but it contemplates the practical ways and means of all that pertains to x-ray including society work.

Committee on Medico-Legal is the fourth committee:

Chairman: Dr. Mihran K. Kassabian, Philadelphia Pa., 1808 Green street.

Dr. F. Wessley Sells, Murray, Iowa.

Dr. Constantine V. S. Boetger, Ottawa, Ont. Canada.

Dr. Frank Ring, St. Louis, Mo., 612 Chemical Bldg.

E. Flieschman-Aschhiem, San Francisco, Cal.

Dr. S. D. Brooks, Surgeon, U. S. Marine Hospital, Portland, Oregon.

C. Edmund Kells, Jr., D. D. S., Medical Bldg., New Orleans, La.

Every member of this committee will have an opportunity to consult attorneys and join with them legal opinions upon all the phases of the x-ray. The greatness of the subject will give you a ready hearing with the best legal lights. The proof of the picture will be one of the chief interrogitories.

The Roentgen Society of America will meet in Buffalo, N. Y., sometime during the month of September. Two days set aside for the meeting will be named by the Committee of Arrangements during the month of April. The Committee of arrangements so far named in Buffalo is as follows:

Chairman: Edgar B. Stevens, 688 Seventh street; Dr. Elmer E. Staar, 523 Delaware avenue; Dr. Renwick R. Ross, 100 High street; Dr. James W. Putnam, 525 Delaware avenue; Secretary, Roger Cook Adams.

The committee has already convened, and in the language of Dr. Putnam: "The committee are anxious to do all possible to make the meeting a success." This assures us again a great, enthusiastic and useful meeting.

FLUOROMETER.

An English writer has given the names of several inventors who have devised accurate means for the localization of foreign bodies. Moore, Payne, Flemming and Mackenzie Davidson are mentioned and especially Remy because he has done more than others to simplify the work. It is disappointing that the invention of an American was not given consideration for his invention is equally perfect, more practical and more simple. John Dennis, of Rochester, N. Y., invented the Fluorometer and for accuracy, simplicity and convenience there is nothing yet found superior in the armory of the x-ray worker.

This is the age of diagnostic medicine, and therefore

THE AMERICAN X-RAY JOURNAL.

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VOL. 8. ST. LOUIS, APRIL, 1901. NO. 4.

CONTENTS VOL. 8, NO. 3.

Dr. G. P. Girdwood.
On Stereoskiagraphy.
Stereoscopic Skiagraph of Monster.
Distinction of Gall Stones.
Radiograph, by Dr. Pitkin.
X-Ray Laboratory.
Technique of X-Ray Work.
Stereoscopic Fluoroscope.
Committees.
  1. Standardization.
  2. Scientific Research.
  3. Ways and Means.
  4. Medico-Legal.
Committee of Arrangements.

CONTENTS VOL. 8, NO. 4.

Observations on Crooke's Tubes, Etc.
Some Hints for X-Ray Workers.
Renal Calculus.
Efficient and Negligent Practice.
Determining Death by X-Rays.
Roentgen Society of the United States.
Roentgen Society.
Detecting Signatures by X-Rays.
Deplorable.
Laboratory of Prof. Bouchard.
How to Diagnose Intestinal Obstruction.
Unsolved Problems of Medicine.
Communication—Elihu Thomson.
Seehear.
The Crossing of X-Rays.

ROSWELL PARK, A. M., M. D.
Member of the Roentgen Society of the U. S.,
Buffalo, N. Y.

THE AMERICAN
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VOL. 8. ST. LOUIS, APRIL, 1901. NO. 4.

OBSERVATIONS ON CROOKE'S TUBES, ETC.

BY H. WESTBURY.

Read before the Roentgen Society of the United States, Grand Central Palace, Dec. 11, 1900.

One naturally feels some little difficulty in reading a paper at the present time on Crooke's Tubes, owing to the fact that the subject has already been covered very amply, and so far as our knowledge goes up to date, conclusively in the various scientific papers and lectures. However, as I believe that there are a number of observations that have been only moderately discussed, I trust that this paper will be of some interest.

As is well known, Professor Roentgen's discovery of the x-rays following up the experiments made by Hertz, Lenard, Crooke and others, was cabled to the *Sun* on January 6, 1896, although he had first observed the phenomena on November 8, 1895. All the leading scientists in this country were at once interested and proceeded to verify Professor Roentgen's assertions. I well remember the first time that Mr. W. H. Meadowcroft and myself produced x-rays. I think our feeling even then with the proof before our eyes was one of disbelief. We can all remember the interest taken by the public through the first months of 1896, together with the usual amusing surmises as to the possible use of the new discovery which appeared in the press. By about April, 1896, it was on a recognized footing, and gradually the various hospitals were adding x-ray facilities to their plant.

A few words on the cathode or ether ray and x-rays themselves:

Cathode rays are supposed to be produced at a pressure of about a millionth of an atmosphere. They are generated from any source of electricity with voltage high enough to force a discharge through a Crooke's Tube. They proceed perpendicularly from the surface of the cathode in straight lines and fall upon the opposite wall of the tube producing fluorescence. If any object be placed between the cathode and the opposite wall of the tube, a black shadow of the object is cast upon the wall of the tube. The path of the rays is entirely independent of the position of the anode. They can be deflected from their straight path by either pole of a magnet. Two parallel streams of cathode rays repel each other. If the rays fall upon a balanced object in the tube it will rotate. Making the cathode concave and so bringing the rays to a focus, heats the anode rapidly. The glass walls of the tube are opaque to the cathode rays. The x-rays are supposed to be produced at the same time as the cathode rays, originating at the end of the latter and passing out of the tube into the air. They produce fluorescence in certain chemical compounds such as T. of calcium, platinocyanide of barium, etc. Wood, paper, cloth, metals, flesh, etc., are transparent to the rays, although not to the same degree. They affect photographic plates, and thus give shadow photos of objects otherwise concealed. They are not believed to be light rays as they can not be reflected, refracted or polarized. Two views are held as to the nature of the cathode ray; one that these rays are a radiation in the ether, probably transverse waves like light, hence they are sometimes called ether waves; the other that they are streams of particles of the gas still left in the tube projected from the cathode. If, however, rays can be produced in a tube entirely free from air, it is evident that the second theory is incorrect. If there is left a small hole in a tube, and a thin plate of aluminum sealed in, the cathode rays pass out and can be deflected with a magnet. The first theory is well supported, but does not explain why a magnet deflects these rays or why two cathode streams repel each other, as nothing similar is known in light radiation.

It was early appreciated that the three things in which great improvements were necessary were the exciting apparatus, the fluorescing screen, and the Crooke's tube. With the first I have nothing to do in this paper. The screen has unfortunately stood practically where it started until now in spite of numerous experiments with all kinds of salts, of which the following have been found to fluoresce in varying degrees, viz:—

Platino, cyanide of barium, Tungstate of Calcium (these fluoresce better than any other salts at present known), Tungstate of strontium, subchloride of mercury, mercury diphenyl, cadmiumx iodide, sulphide calcium, potassium bromide, potassium iodide, tetrametaphosphate of lead, mercurous chloride, bromide and sulphate lead, fluorite, powdered lead glass, pectolite, sodium cressotinate, ammonia salicylate, calcium salicylate, salicylic acid.

Neither Tungstate of Barium or lead fluoresce appreciably. There are a large number of other chemical and mineral salts which also fluoresce but not to so great a degree as those above mentioned. Among these may be mentioned powdered German glass, barium fluoride, calcium fluoride, sodium fluoride, sodium chloride, mercuric chloride, cadmium chloride, silver chloride, lead chloride, lead iodide, sodium bromide, cadmium, lithia bromide, mercury, cadmium sulphate, uranium phosphate, nitrate of uranium (which fluoresces almost as well as tungstate of calcium), acetate of uranium, molybdic acid, silicate of potash, sodium bromide, wulfenite, orthoclase and alucite, herdinite, apatite, calcite, and many others.

Sulphide of zinc and sulphide of calcium can both be used for strengthening screens in contact with x-ray plates. I am afraid lists of chemicals are more or less tedious, but the above are interesting mainly from the fact that there is no doubt that improvements must be made in screens or tubes by the aid of such fluorescing salts, hence their importance.

Tungstate of calcium at first generally used for this purpose has been universally superseded by platino cyanide of barium, which, however, is extremely troublesome to handle, owing to its instable nature, the least friction or dirt spoiling it. In my opinion, therefore, a cheaper and more durable fluorescing substance is much to be desired.

Harrison, N. J.

[*To be continued.*]

There is no way for any one to be technically or practically informed on the subject of x-rays unless he gets the matter from the AMERICAN X-RAY JOURNAL. We glean all there is from the entire world and publish monthly new matter, which every physician should read.

SOME HINTS FOR X-RAY WORKERS.

BY BENJ. F. BAILEY, M. A.

For some time past, experimental work has been carried on in the laboratory of electro-therapeutics at the University of Michigan, for the study and improvement of x-ray processes. We have a full equipment for this kind of work, including induction coils, two high tension, high frequency sets and two large static machines. I have worked a great deal with each of these and my own experience has been that I can do the best work with the induction coil in connection with the Wehnelt interrupter. Each method has its own special advantages and disadvantages. The Wehnelt interrupter is not so easy to handle as some other forms, but for difficult exposures my belief is that no other form can equal it. A considerable number of inquiries have convinced me that a need exists for some directions for practical work with this interrupter. I have, therefore, written this, hoping that it may help others to avoid some of the difficulties I have encountered.

Until recently, the Wehnelt interrupter has not been available in a form suitable for general use. The form here described works well, and seems to meet the requirements. The fundamental idea of the Wehnelt, and in fact, of all electrolytic interrupters, is to cause the current, somewhere in its path through the cell, to flow through a very narrow section of the liquid. There are several ways of doing this. One simple method is to interpose between the electrodes, an insulating barrier of glass or other suitable material pierced with a small hole. All the current is then forced to pass through the hole in its transit from one electrode to the other. The nature of the electrodes and of the solution, is of minor importance. It is evident that the resistance in the hole is very great, consequently, considerable heat is developed there, and being applied to a small body of liquid, it heats it very rapidly. A bubble of steam forms and breaks the circuit, and is in turn almost instantly removed by condensation and by rising in the liquid, allowing the action to be repeated.

This is the Caldwell Interrupter and is really the fundamental form, the Wehnelt being a modification of it. The essential feature is the narrowing of the current stream, and in the Wehnelt Interrupter this takes place at the anode. The principle is the same as before, but in addition to the heat effect, we have the electrolytic effect. This complicates the phenomenon somewhat, and the presence of the electrolytic products prevents the interruption taking place at the cathode, but allows it to occur as well as before at the anode.

The practical method of accomplishing this narrowing of the current stream, is usually to seal a piece of platinum wire, about No. 18 in size, in the end of a glass tube, leaving about one-eighth of an inch projecting into the liquid. The tube is filled with mercury, to provide an easy connection with the leading in wire and to carry away the heat generated. The cathode may be any metal not attacked by the electrolyte. Lead is cheap and convenient and is generally used. A great number of electrolytes may be used. Sulphuric acid in water (one to four or five), is the solution usually used.

The interrupter so constructed, has grave faults, which completely prevent its use by the average x-ray worker. The greatest trouble comes from the platinum point cracking out of the glass on account of the severe heating to which it is subjected. The average "life" of this form of anode, is probably about ten minutes of actual use. Moreover, it is impossible to adjust the length of platinum exposed except by shortening it permanently.

A drawing of the form which I have finally adopted, is shown in Fig. 1, and a view of the same thing made up in a simpler form, is shown in Figs. 2 and 3. The anode described stands to the right in Fig. 2. It consists of a piece of glass tubing, 8-in. by ½-inch, joined to a 1-inch piece of capillary tube. The capillary should fit as closely as possible to the piece of platinum, but must be large enough to allow free movement through it. No. 18 platinum wire is large enough for currents up to ten amperes. This wire is soldered directly to the end of a brass rod, threaded at its upper end, where it passes through the brass stopper. Its upper end is provided with a milled head for adjustment. The vital point of the apparatus is where the rod passes through the stopper. All the connections here must be air-tight, as the liquid inside the tube shows a very marked tendency to rise and would rise to a height of several meters if the tube were large enough. The only way I know of to stop this, is to make all connections air-tight. The liquid inside does no harm, but if allowed to rise and flow over the top, it forms a conducting path and the interruption ceases.

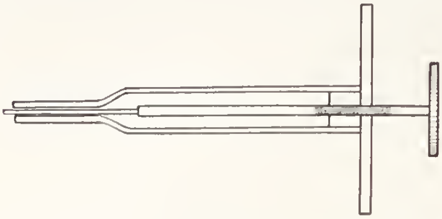

FIG. 1.

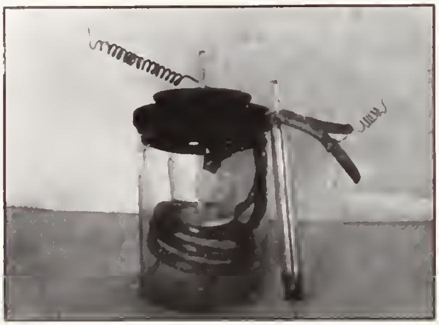

FIG. 2.

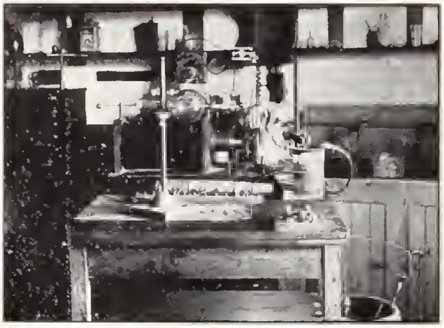

FIG. 3.

A simpler form is made by merely passing the brass rod through a closely fitting cork. This form of interrupter will last until the platinum is eaten up and seems to be free from the faults of most other kinds.

Another difficulty is due to the fact that the liquid in the jar heats up quite rapidly. If the jar is of about gallon size this will usually not take place rapidly enough to do any harm. If, however, the apparatus is to be used for long periods, it is best to make the cathode of a coil of small lead pipe, both ends being left outside the jar. By passing cold water from the top through the coil, the temperature is kept down. The slight grounding is generally harmless, providing a rather long rubber hose is used to make the connection to the top. It would hardly do to use a metallic connection.

Fig. 2 shows this arrangement applied to the Caldwell Interrupter. This is composed of an inner and an outer glass jar, the inner one of thin glass. The diameter of the inner jar should be seven-tenths that of the outer. The bottom of the inner jar is pierced with a hole from one to three millimeters in diameter. A fine, tapering glass rod is sometimes used to adjust the size of this hole, but the break is not so sharp as with the plain hole. It is best to use a jar pierced with several holes, and means to stop up tightly all but the one in use. Both anode and cathode are preferably lead. Personally, I prefer the Caldwell Interrupter in direct currents, the Wehnelt in alternating.

To work with alternating currents, this is all that is required, but if work is to be done with direct currents, we require an inductive and a non-inductive resistance. The former consists of a coil of about one hundred turns of No. 18 wire, wound on a core of iron wires about 8 in. by 1 inch. Taps should be brought out so that from ten to the full number of turns can be connected in the circuit.

As a non-inductive resistance, I use a ten-gallon jar of water with two carbon rods dipping in on opposite sides as electrodes. Enough salt is thrown in to bring the water to the right conductivity, and the finer adjustment is made by moving the carbon rods. The complete apparatus is shown in Fig. 3. The whole outfit should cost but very little to have made, or it can be readily constructed by the user.

Fig. 4 shows the connections for use, with the direct current. The interrupter, the coil, the inductive and the non-inductive resistances, are connected in series with the mains through the switch (the order is immaterial,) and a fuse is inserted to avoid blowing the main fuses. The ordinary vibrator is screwed up tightly so it can not act. The voltage of supply may be anything from 100 to 250 volts. I have not tried higher voltages, but they might work well. Care should be taken that the wiring is heavy enough to carry the current used, but special wiring will usually not be necessary.

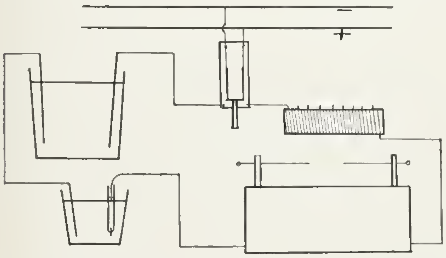

FIG. 4.

The strength of current is regulated by the water rheostat and, to some extent, by the amount of platinum exposed. The frequency is increased by decreasing the number of turns of inductive resistance and by shortening the platinum point. Usually the frequency should be as high as the interrupter will allow and work well.

If the alternating current of 125 or 60 cycles is available, it is far preferable to the direct current. Here, if the voltage is about 110, which is practically always the case, it is only necessary to connect the interrupter and coil directly in series across the line. This is exactly the same as for the direct current, except that the inductive resistance and the liquid resistance are left out entirely. The amount of current is regulated by the projection of the platinum point. The frequency is now fixed by the frequency of the alternating current and can not be changed. A number of curves of the current waves which I have taken, show that one interruption takes place in each positive wave, i. e., in each wave of current from the platinum point to the lead plate. No interruption, or only a partial one, takes place during the negative wave.

This makes an exceedingly convenient arrangement. Only one adjustment is necessary, that of the projecting platinum point. As was said before, the number of interruptions per second, can not be changed. This may be thought by some to be a disadvantage, but in practice I do not find it so. I may be mistaken, but I am strongly of the opinion that the frequency of the discharge has nothing whatever directly to do with the radiation of the tube, any more than it has in an incandescent lamp. In both cases it is the total current passing that produces the radiation. In an ideal interrupter we would be able to make the number of breaks per second anything we choose, without changing the rate at which any one interruption takes place. That is, we ought to be able to get one break or one thousand per second, and have the actual breaking of the current take place in the one in precisely the same time as each of the one thousand occupied. This would be desirable, but it has never been reached or even approximated in practice. In the ordinary induction coil vibrator, if we decrease the rate of vibration, the separation of the platinum points takes place more slowly, and the E. M. F. generated in the secondary, is consequently less. The same thing holds in the rotary break or any of the mercury interrupters. The practical result is that we can not reduce the number of interruptions per second to a low number. The only place where this would be of any great advantage would be when we wanted a strong radiation, but could not run constantly on account of heating of the tube. Then it might be better to have a few strong flashes per second. But this necessity can be avoided by using the tube adapted to heavy currents.

One advantage of using the alternating current, is that the interrupter "works" better with the direct current; if the interruptions are very fast, the action is likely to stop. The interrupter gives off a curious sucking sound and the point turns red. On opening the switch and again closing it, the interruptions will again begin to take place. Now, with the alternating current the current is stopped and started 125 times per second. Consequently, if one interruption is missed, the next will probably take place all right. Hence, the interrupter being once started, the action will continue indefinitely.

With the alternating current the discharge through the tube or over a wide air gap, is unidirectional. This is due to the fact that the interruption takes place only in the positive wave. The E. M. F. due to the regular alternation, is not sufficient to bridge the gap or pass through the tube. Consequently, with this arrangement we use a single focus tube, although operating the coil with the alternating current.

If the Caldwell Interrupter be used, since it is symmetrical in arrangement, interruptions take place in both directions. Consequently, the secondary discharge is alternating and we must use a double focus tube. This requires, however, a rather high voltage, and I have not succeeded in making it work well on 110 volts.

TUBES.

The tubes used in this work must have rather a high vacuum for two reasons. In the first place, if of too low resistance, the inverse E. M. F. is sufficient to send some current through the tube and the definition is impaired. Moreover, if of low vacuum, too much current passes through, and the anode will become red-hot in a few seconds. It must be remembered that we now have 125 discharges per second, when with the ordinary vibrator, screwed up tight for great spark length, we get only five to ten. The heating effect is therefore, ten to twenty times as great. An old tube, whose vacuum has become so great that it is useless for ordinary work, is excellent here.

Ann Arbor, Mich.

[*To be continued.*]

The greatest evidence of a doctor's fitness to do x-ray work is shown by his reading the AMERICAN X-RAY JOURNAL, and conversely if he does not read it he is trying to do the impossible, for he can not have the facts for best work.

THE PATRON SAINT OF THE STATIC MACHINE.

The inventor of the Mica Plate Static Machine, Rome V. Wagner, M. D., is well known in all branches of electrical work pertaining to Physicians and Surgeons, but the rapid rise in popular favor of his Static Machine ranks him as the Patron Saint of Statics. Have you seen his X-Ray talk, gotten out by R. V. Wagner & Co., Chicago?

RENAL CALCULUS.

BY J. N. SCOTT, M. D.

Lecturer On Electro-Therapeutics University Medical College.

Fig. 1 shows a calculus in the right kidney, ¾ in. in diameter. The radiograph is of a female child 3½ years old. Details of making the radiograph:

Apparatus used consisted of three 12 inch spark induction coils connected in series, and capable of giving a 30 inch spark of large volume. The secondarys are wound with No. 32 wire. Current used. The apparatus was attached to the 110 volt direct current, with an adjustable German silver rheostat in series. The current through the primary was flowing at the rate of about 18 ampheres, but was varied according to the amount of secondary current the tube would take. Tube used, was the General Electric Co. funnel focus with vacuum regulator. Vacuum—the tube would back up a parallel spark 2 inches long. Spark gaps—the series spark gap was 1½ inches long. A shunt adjustable gap was used as a fine regulator of the current in the tube, more current was used than the tube would take continuously without melting the anode, and as soon as the anode would become too hot, the current was cut off for a few seconds by means of the adjustable shunt spark gap. Position of patient—the patient was placed on her back, with tube over the median line at a level of the illiac crests. Time of exposure, 7 minutes. Tube distance from plate, 20 inches. Thickness of body on a line with calculus, 5½ inches. An anesthetic was used during exposure because child would not remain quiet. Plate used, double-coated x-ray Developer, metol hydrochonon. The child had symptoms of calculus but it was uncertain whether it was in the kidney or bladder.

Fig. 2, Radiograph of a man 36 years old, showing calculus, in right kidney. Apparatus, tube, current, etc., used, same as in description of preceding radiograph. The patient was placed on his back. Position of tube was directly over the right kidney. Time of exposure was 11 minutes. Tube distance from plate 26 inches. Thickness of body on a line through kidney 12¼ inches. Plate used, double-coated x-ray. Developer, metol hydroconon.

FIG. 1.

From reports of cases the general methods used of locating a calculus is to use a tube of as great penetrating power as possible, make the exposure short, varying from a minute to three or four and obtain really an under exposed plate. The claim is made that if you expose longer you will penetrate the calculus to such an extent that its outline will not appear on the negative. I have tried all lengths of exposures from a few seconds up to 20 minutes and my most uniform results have been obtained by the following method: I use a tube which will give off the largest volume of ray possible with only enough penetration to obtain a normally exposed plate for the given thickness in from 10 to 13 minutes in an adult according to the thickness of the patient. In developing the plate I develop to obtain as much detail as possible. In order to obtain the large volume of ray I use a tube capable of taking a large quantity of current. To do this the anode must be made of thick hard platinum or irido-platinum, preferably backed with aluminum or the funnel shaped platinum anode, which instead of scattering the rays in all directions in front of the anode, as is the case when the flat one is used, concentrates them into a small area, and having a large surface it radiates the heat rapidly. I pass as much current through the tube as possible without melting a hole in the anode or lowering the vacuum. When we use the large volume of ray which will just penetrate the soft tissues and effect the plate in a reasonable length of time, we have a ray which will penetrate a substance a little more dense than the surrounding tissue to the same extent, and I think will give more contrast than a more penetrating ray. I think that a ray with high penetration and small volume will give less gradation between parts of nearly the same density than one of large volume and low penetration. This can be illustrated by taking a number of pieces of pasteboard placed on a large piece, making 1-2-3-4-5 and 6 layers, making two radiographs of them; for one exposure use a high vacuum tube and the other a low vacuum. Use the same quantity of energy in both trials. The one taken with the low vacuum will have the finest gradation of shadows. I also find the above described method the most satisfactory for bringing out consolidated lung tissue in a radiograph.

FIG. 2.

Kansas City, Mo.

EFFICIENT AND NEGLIGENT PRACTICE.

This little history well represents the condition of our profession and the laity.

The skiagraph marked No. 1, represents the condition of a fractured thigh taken a few hours after injury. The Southern Railroad seems to be to blame for the accident, for they settled a claim for damage. The surgeon of the road, Dr. Geo. Bazemore, acted with promptness and foresight characteristic of a true surgeon in obtaining the best skiagrapher in the State to picture the accident as it actually existed in the person he was called to treat. He did not call for kodak pictures of the box cars and extraneous things in proximity, about the only thing that interested the people —the officials of the road and the court, heretofore. The doctor was interested in the case and desired to know its condition before the responsibility was assumed. He properly used a temporary dressing and sent the patient to his home and in due time made preparation for a permanent dressing. The latter he was prohibited from doing, however, because the railroad company refused to assume responsibility and the father of the patient chose his family doctor. Doctor No. 2 asked to see the skiagraph that had been taken, but without authority of the other physician and was therefore properly denied. Nine months after the accident the thigh has the appearance as seen in Plate No. 2. The doctor used good judgment in trying to get a view that had been taken and it is quite possible that the patient could not bear the expense of an x-ray examination. This should have been a simple case and without the x-rays methods are known that are positive, equally with

FIG. 1.

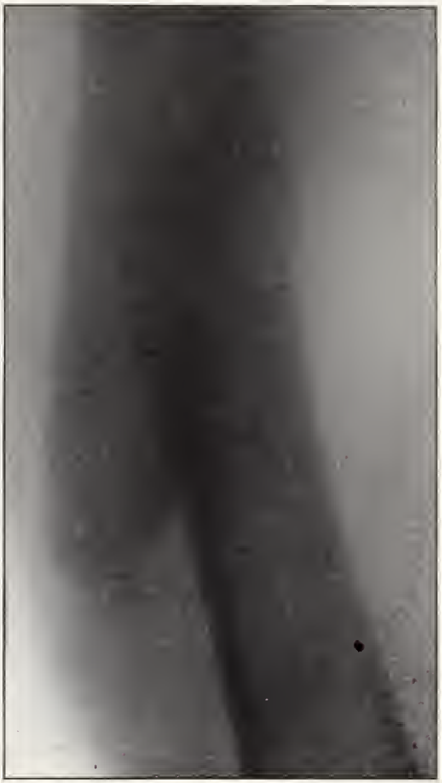
FIG 2.

the light to guide the surgeon. But as we have before pointed out: all injuries should be skiagraphed as soon as possible, once or twice during the process of repair and when the case is dismissed. This is a record and justly defends the doctor, the patient and others interested. The very moderate prices made by Professor Horner for such work would not much encumber a doctor though his case was poor. It is these cases that often worry us so much.

In connection with this case it is proper to say that the officials of the Southern Railroad have shown a kindly disposition towards the use of the x-rays with the injured of the road. The employment of Professor Horner to do the work for them assures proof of the picture in case of litigation. He thoroughly understands the use of the Fluorometer and can with this instrument for correcting distortions, go into court with positive evidence, and no court can throw him down, for he is armed with the evidence of truth, and the simplest language conveys the facts understandingly. Physicians and corporations should everywhere recognize these truths and accomplishments.

DETERMINING DEATH BY X-RAYS.

"Prof. Ottolenghi, of the University of Sienna, has discovered that while it is easy to apply the rays to the lungs of persons who is alive or in trance, it is extremely difficult, indeed practically impossible, to apply them to the lungs of a person actually dead. The reason was that some intervening obstacle prevented the rays from penetrating into the body. Over and over he made a test of this kind and in each case the result was the same. He suggests that as this test can easily be made by any physician, it should in future be employed in all cases where doubt exists of death."

ROENTGEN SOCIETY OF THE UNITED STATES.

ANNOUNCEMENT OF COMMITTEE ON ARRANGEMENTS.

The Committee on Arrangements for the next meeting of the Roentgen Society of America have secured, through the courtesy of the Dean and Faculty of the University of Buffalo, the use of as much of its building as we may require. The location is central, the room ample and on the ground floor. The date of the meetings will be Sept. 10 and 11 at the University of Buffalo, Buffalo, N. Y.

The following rules and regulations in regard to exhibits have been adopted by the committee: Applications for space should be sent as early as possible to R. C. Adams, Secretary, Drawer No. 963, Buffalo, N. Y., with particulars as to character of exhibit and space needed.

Exhibits may be consigned to Louis Staffeldt, care University of Buffalo, and all express and freight charges must be pre-paid. Owners of goods sent by freight who wish them transferred to place of meeting on arrival, must notify the secretary and send him the pre-paid bills of lading. The cartage will be at expense of owners.

Exhibits are wholly at risk of owners, and should be unpacked and installed by them not later than Sept. 7.

Alternating current 104 volts, single phase, 60 cycles, and direct current 110 volts, will be available, also dark room for photographic purposes. A nominal fee for current and floor space will be charged proportional to amount required.

All exhibits must be removed by Sept. 13.

EDGAR B. STEVENS,
Chairman.
ROGER COOK ADAMS,
Sect'y., Drawer 963.
DR. JAMES W. PUTNAM,
DR. ELMER E. STARR,
DR. RENNICK R. ROSS,
Committee.

ROENTGEN SOCIETY.

The following notice, made by Professor Monell, Chairman of Committee on Standards, appeals to all persons whomsoever, that have any knowledge on this subject; and commends itself especially to medical men having interest in the attainment of more knowledge. Write to Dr. Monell and give expression on one or more of these subjects.

COMMITTEE ON STANDARDS.

Dear Sir:

To promote uniformity in results and to secure accuracy and give legal value to the evidence of x-rays, it is necessary to standardize methods of doing the work. To this common benefit all x-ray experts are asked to contribute for the general good of the cause. You are therefore invited to write me your best suggestions on such of the following points as you can offer advice upon:

A standard uniform nomenclature for the principal terms required.

A standard form of record-blank for briefly filing reports and indicating all essential details of the exposure.

Standard of efficiency for tubes.

Qualities which a standard x-ray photographic plate should possess.

Qualities which a standard x-ray fluoroscope screen should possess.

Standard handle for all x-ray tubes so they will fit a standard tube-holder.

Standard tube-holder to fit uniform standard tube-handle—adjustable, rigid, holding tube without vibration—and convenient for general use.

Standard position of tube for correct shadow.

Standard distance of anode from plate for standard x-ray exposures.

Standard exposure times for chief parts of the body with a standard radiance.

Standard measure of different degrees of x-radiance.

Standard "skiameter."

Standard x-ray examination table, adjustable for all parts of the body.

Standard method of posturing each part of the body for a standard picture.

Standard means of fixing parts immovably during a standard exposure.

Standard complete definition of what a "standard exposure" should be. (Of medico-legal value.)

Standard landmarks to be pictured in the negative as inherent proof that a standard exposure was made—(a medico-legal necessity).

Standard method of localization for both "skiagraphy" and "fluoroscopy," which shall be the most practical, quick and uncomplicated.

Standard technique for picturing correct relation of bones and joints.

Standard technique for picturing details of any kind sought.

Standard technique for picturing contrast for diagnosis of soft parts.

Standard technique for picturing the different calculi, vesical, renal and gall-stones.

Standard technique for x-ray dental diagnosis.

Standard technique for x-ray eye work.

Standard technique for x-ray heart and lung diagnosis.

Standard treatment of plates to develop uniform results.

A standard leaflet of brief directions which the physician who does not do his own developing can send with his plates to any fair photographer as a ready guide to proper treatment of an x-ray negative to secure the picture.

Standard technique for therapeutic administration of x-rays with proper precautions.

You are invited to supply any omitted detail which you believe should be standardized. Will be pleased also to have you select one or more features of the above list in which you have had special experience and make a careful report upon what you regard as the proper standard to officially adopt. A reply is desired in about two weeks. In offering suggestions about standard working methods, postures, special devices, apparatus, etc., it is desirable that you send explanatory camera-photographs illustrating the details for comparison. Thanking you for your professional co-operation in behalf of the committee, I remain, Fraternally yours,

S. H. Monell, M. D.,
Chairman of Committee on Standards,
47 West Twenty-seventh Street,
New York City.

DETECTING SIGNATURES BY X-RAYS.

In the state archives at Rome, says *Electricity*, it has been found that the x-rays may successfully exhibit writing on manuscript concealed in the old book covers whenever this writing is done in red lead, ultramarine blue, or cinnabar. They are being used also in attempts to detect forgeries of paintings and in efforts to discover signatures of old masters in paintings alleged to have been produced by them.

DEPLORABLE.

On page 45 in "Roentgen Ray in Spanish-American War" we find the following:

> "The superiority of the Roentgen ray over other methods of locating lodged missiles is so great that, when available, it should be used to the exclusion of all others."

This is not new, but is recognized by all worthy surgeons throughout the world, now, as a tenet in surgical practice. But how is it with surgeons not far away? We have had reported to us the case of a young man who had been shot, the bullet entering the orbit. Some days after the injury the head was trephined and search made for the bullet. The dangerous probe was used. The patient died. In the post-mortem the bullet was found to have passed downward and outward beneath the zygoma and was lodged just under the skin. In another case: A surgeon (?) used the dangerous probe about the neck of a patient trying to locate a small bullet, although he himself was the possessor of an x-ray apparatus. The operator may have had trouble heretofore in finding missiles after seeing them with the x-ray and therefore returned to the dangerous probe. He does not use the fluorometer in his x-ray practice. Further:

> "With the Roentgen ray at hand, the surgeon can locate a lodged missile at any time when necessity demands, and its track can be left safely undisturbed."

Another case: A fine nail entered the metacarpal joint of the thumb of a young lady and after much ado the surgeon (?) with assistants made a poor dissection of a large portion of the palm, and failed ingloriously. The nail was found with the x-ray to be beneath a sesamoid bone of the thumb. Another case: A bullet entered the palm of a boy's hand near the wrist and passed upwards. The surgeon (?) used the dangerous probe and thinking he had reached the bullet made an ugly wound in about the middle third of the forearm. The x-rays after this cutting revealed the bullet in the elbow joint near the coronoid process. Further:

> "With the probe it is possible to follow only a small minority of bullet tracks."

This is a fair specimen of what is going on although the American X-Ray Journal is published in St. Louis notwithstanding. We acknowledge it does not speak well for us.

LABORATORY OF PROFESSOR BOUCHARD.

Among the researches made at the Laboratory of Professor Bouchard, of Paris, we have received a book of five chapters contributed by Dr. H. Gilleminot, embracing the following subjects:

Chapter I. Radioscopic examination of the subject. Under this head we described two kinds of apparatus which are said to satisfy all the needs of the clinician, one being designed to examine the patient in the vertical position, and the other while lying down.

Chapter II. Treats of the point of incidence in clinical radiography and is amply illustrated to elaborate the views of the author.

Chapter III. Describes minutely the advanced methods of locating foreign bodies, with a view to exact operations for their removal.

Chapter IV. Describes apparatus for radiographing the rhythmic movements of animated organs, and advances a method of cinemato-radiography of the thoracic organs.

The article by J. Rudis-Jicinsky of Cedar Rapids, Iowa, entitled "Gall-stones under the x-rays," printed in the American X-Ray Journal, February, has attracted a great deal of attention for the reason of the clear practical method given "how to find the stone". It is this simple way of telling how a thing is done that makes an article useful.

A STUDY OF STATIC ELECTRICAL APPARATUS.

BY JOHN TOWNSEND PITKIN, M. D.

ARTICLE NO. 1.

From the history of electricity we learn that the static variety or degree of electrical energy was the first to be investigated and utilized.

That one *Otto von Guerick, the jocund burgomaster of Magdeburg, in Germany, constructed the first static machine, consisting of a revolving ball of sulphur rubbed by the hand of the operator. Through this invention he gave birth to the progenitor of all dynamo and static machinery, the former being only a modification of the latter.

In course of time the more simple forms of dynamos evolved into engines of power, so that they moved the levers and engines of industry and transportation. By transformation of their electro-magnetic currents they illuminated our streets and buildings, supplied us with heat for manifold purposes and placed us in electrical touch with our neighbors and remote portions of our continent, even the lands beyond the sea, while their parentage was forgotten and static electricity only employed as a plaything or scientific curiosity.

When men of science became aware that all living organisms require a given static electrical potential for their health, comfort and maintenance, and for reasons already pointed out through the columns of this valuable journal, that the ideal excitor of the Crooke's tube for the production of x-radiance is static electricity, the scene changed and the static machine so long neglected, was taken from obscurity, improved, transformed, and has become the healer of diseases which baffle all other methods of treatment, and with its x-ray search-light has made the practice of surgery and medicine approach more nearly to an exact science. An eminent instructor of surgery advises his students to always carry the bones of the human forearm in their (mental) pockets. The Leyden jars of the static machine should be similarly cherished by all x-ray workers.

For, barring the fact that the static apparatus is self-exciting and capable of maintaining continuous activity, it is but a large Leyden jar of diversified construction.

Hence, it follows, that a static generator having two ordinary condensers attached, may be considered as three Leyden jars variously connected.

When, as is the usual arrangement of the jars, their inner coats are connected one to each of the arms of the prime conductors of the static generator and the outer coating rests upon a wooden shelf or bracket, short circuits will form between the two jars and the jars and the machine proper, during functional activity, thereby reducing the amount of otherwise available current required to operate a Crooke's tube placed in simple series. The current wasted will increase with the amount of resistance offered between the discharging rods of the prime conductors. Thus the loss is greatest when a strong current is most desired e, g, for the excitation of a tube of high vacuum and great efficieney. Placing a glass or porcelain dish beneath the jars, very materially lessens the leakage, but even then, with powerful generators, discharges will often take place between the external and internal coatings of the condensers or the external coats and other portions of the static apparatus (most frequently on the positive side). The discharges may be sudden or disruptive, accompanied with considerable noise, convective or silent, or a creeping of the current over the intervening glass surface may occur, when allowed to become dusty or covered with little particles of elementary carbon. Such discharges often disturb timid pa-

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*See Intellectual Rise in Electricity. By Benjamin.

tients undergoing examination rendering them unsteady. They also lessen the volume of current passing through the tube, cause the x-ray light to flicker and efface some of the finer details from the sensitized photographic surface. The most effectual means of arresting this form of electrical loss is to fill the jars with crude petroleum and then place them in a deep outside retaining vessel, made of glass or porcelain and filling all intervening space with the same oily insulator. Thus immersed, the electrical charge of the condensers is retained upon the metallic coatings and the danger of piercing the dielectrics reduced to a minimum. To operate the jars as static transformers, the external coats may be electrically connected to each other by a metallic chain the ends of which are dropped into the outer retaining vessel.

Placing the outside coat of a single Leyden jar in contact with woodwork of an apartment increases the capacity of the condenser by enlarging the extent of chargeable surface. The effect is the same as if the external coat had been made greater, but when two or more jars are dissimilarly electrified and then allowed to touch the same woodwork their respective charges will intermingle and neutralize each other with considerable loss of energy.

Similarly if it were possible to connect one side of a static machine with the floor of the operating room without, sustaining leakage from the other side, the capacity of the machine would be considerably augmented, but the imperfect insulation of the average static machine renders that practice impracticable. As it is impossible to pump electricity from the static machine into the ground or from the ground into the machine, which the expression "grounding of the apparatus" would imply, the employment of this misleading expression should be discontinued. Buffalo, N. Y.

CORROBORATIVE EVIDENCE NECESSARY.

In his admirable address, on taking the chair as President of the Roentgen Society, London, Dr. John Macintyre of Glasgow, after briefly stating the eight conclusions of the American Surgical Association on the medico-legal aspect of the x-rays mildly said: "It may here be pointed out that where doubt it expressed the findings of this or any other association may be required to be changed any day; they do not stand for all time. By way of comment further, we may emphasize the point that in every branch of science corroborative evidence from every other source should always be obtained; that every x-ray photograph does not reveal all that could be revealed by photography, and that sometimes the best results can be only obtained where the surgeon combines in himself professional knowledge with that of the expert in x-rays." He also calls attention to the fact that the Association omitted in their discussions the value of stereoscopic observation by plate or screen. If Dr. Macintyre had read Dr. Kelly's observation on the "lukewarmness of the Association on this most important subject," he would not have been surprised with the proceedings. There is another thought which is especially noticeable in one of the conclusions of the committee which is very commendable and characteristic of the advanced surgeons of our country: "That the surgeons should familiarize themselves with the appearances of photographs, their distortions, and the relative value of shadows and outlines, so as to be able to judge for themselves and not have to depend on the interpretation of others who may lack surgical knowledge necessary for a proper interpretation."

Subscribe now for THE AMERICAN X-RAY JOURNAL.

Lynn, Mass., Feb. 11, 1901.

Dr. Heber Robarts, 301 Chemical Building, St. Louis, Mo.

My Dear Sir:—In regard to the projection of x-rays from the anode of a Roentgen-ray tube, in answer to your inquiry of Jan. 30, I would say that the rays are in reality projected in much larger amount from a spot—which is not a point but a perceptible area—towards which spot the cathode rays are thrown from the cathode. This spot may be considered in most cases to be about 1-32 to 1-16 of an inch in diameter, though in many cases it exceeds these dimensions. If it were a point the definition of the Roentgen-ray picture would be excellent even at very small distances from the tube, but it is well known that to get sharp pictures it is requisite that the distance be not too short, since the further away we are the more rays will appear to emanate from a point, though in reality coming from a disk or circle.

While it is a fact that most of the rays in a well constructed tube come from a bombarded spot on the anode, it is also a fact that in no tube do all the Roentgen rays emanate from that spot. There is a scattering action and diffusion which causes other parts of the anode to emit rays feebly, and even the glass parts of the tube take part in this feeble emanation, The expedient of a circular diaphragm, i. e., a metallic sheet such as a sheet of lead with a hole cut in it, is often resorted to, to cut off these extraneous rays and limit the used rays to those emanating from the anode spot (or bombarded spot) alone. This improves the general definition, or lessons the tendency to blur.

Roentgen rays, however, in traversing tissue or any substance more or less transparent to them, undergo a scattering or diffusion, i. e., they set up secondary ray emanation in the tissue itself, and of course this ray emanation is in all directions. It is for this reason that it is so difficult to obtain a clear definition on a screen or photographic plate through the thicker parts of the body. This diffusive action may also be diminished to a large extent by the employment of diaphragms, allowing just such a cone of rays to pass through as are concerned in the particular examination under way. This fact has been emphasized by Dr. F. H. Williams, of Boston, I believe, in some of his papers on the use of the x-ray in delicate examinations of the thoracic viscera.

Very truly yours,
Elihu Thomson.

SEEHEAR.

Rollins, in the Electrical Review, N. Y. City, Feb. 2., has given an account of the seehear and stethoscope with two new features, one a sound chamber, the other a fluorescent screen. The seehear has the advantage in hearing the sounds in the chest of a patient while the organs are under inspection of the x-rays. In vol. 5, No. 1, July issue of the American X-Ray Journal, 1899, three pictures were given of the seehear by the same author. The first picture showed the seehear, the second picture showed the seehear in use by physician and the third showed the seehear in use.

It is well known that within the past few years by the use of the Air Drill and the Electric Drill the cost of gold mining has been reduced from 50 per cent to 90 per cent; that by improved machinery and the chemical processes the extraction of gold and silver from the ore has also been equally reduced; that all items of expense connected with mining have been so materially reduced that mining has passed from the condition of being a mere venture to that of the most profitable occupations. Money now put into a conservative, legitimate mining company is not a "gamble" but is an investment.

UNSOLVED PROBLEMS OF MEDICINE.

Dr. George F. Shrady, the talented editor of the great New York *Medical Record*, and eminent surgeon, has recently written on the "Unsolved Problems of Medicine" in which he refers to the advantages of the x-rays and especially mentions "that President Garfield would never have died from Guiteau's bullet had the Roentgen rays been discovered at that time." In writing upon any question in medicine it is customary to cast aside figurative speech and speak at least relatively. I would judge, however, in this instance Dr. Shrady had indulged a little, for I take it that he had seen many articles on the "fallacies of the x-rays" written by men to the front in medicine, and according to precedent had the right and license to write upon innovations, though but feebly understood by them. Then, if he had read these articles he must know that the bullet shot into President Garfield was deep seated, as it was found encysted on the splenic artery and near that organ. Dr. Shrady himself, I believe, was one of the surgeons in the case. The bullet was probably 3½ inches from the surface at the nearest point. Now according to these learned writers upon the fallacies of the x-rays in diagnostic medicine, the surgeon seeing the bullet either in subject or on plate would in cutting have to search for the bullet. Its proximity to vessels and nerves would have necessitated the infliction of serious injury groping in the dark, enough of itself to hazard the patient's life. Recently one of the Ex-Presidents of the American Medical Association, under his own signature, wrote of the difficulty he encountered in finding the bullet in a knee, so fallacious were the x-rays. But I am inclined to believe that Dr. Shrady has had some good information on the correctness of the x-rays. If the doctor is writing with this view in mind then he is correct, so far as locating the bullet mathematically is concerned. This is true. No one is honest with himself or with his patient who attempts to locate foreign matter within the body without having the devices and the understanding how to correct distortions. Thus fortified the good surgeon would have gone directly to the bullet soever deep it may have been.

The Illinois School of Electro-Therapeutics of Chicago has far exceeded the expectations of its incorporators. Within one year their space has been doubled and their faculty increased. The fact that this is the only strictly ethical school of its kind for physicians should make it popular with the profession. At a recent meeting of the board of directors it was decided to advance the price of instruction after May 10, 1901, except to those who matriculate prior to that date. This matriculation fee will be deducted from the price of the course when taken and allows such students to enter at any time during the year.

Write for bulletin of information, 1301-2-3 Champlain Bldg., Chicago, Ills.

Stringtown on the Pike, by John Uri Lloyd, is an interesting story of country life in Kentucky, beginning in the stirring times of '63. The author is especially successful in his portrayal of the different characters. The love Sammy Drew and Redhead bore Susie and their hatred for each other; the superstition, cunning and faithfulness of Cupe; the Parson's peculiar power to force the confession of murder from the Colonel and his swift vengeance; the refusal of Mr. Manning to own his child and the result thereof; the hope for gain; the thirst for revenge; all of these show a deep insight into human nature. It is in short an extraordinary story of ordinary people.

HOW TO DIAGNOSE INTESTINAL OBSTRUCTION.

BY DR. J. RUDIS-JICINSKY.

The diagnosis of intestinal obstruction is nearly always one of the most difficult. The site of the occlusion can rarely be determined positively by the usual methods of diagnosis. A careful study of the case along with the different causes producing the affection ends very often negative. Prognosis in these cases is grave, but guided by the cause. Strangulations, invagination and twisting give not very favorable outlook always. Collapse may occur sooner than we might expect in such a sudden or gradual closure of the intestinal canal. But the case may be diagnosed soon and absolutely correct if we apply the x-rays in time. I have made few experiments in this line, just to see what can be done for those who suffer from intestinal obstruction. I have produced an artificial obstruction in the intestines of three dogs, one strangulation, one twisting and one produced by a foreign body not opaque to the x-rays. In all the cases the exact condition of affairs could be made out in three hours with the help of the x-ray. I gave for the purpose of diagnosis to each dog a pill, which after elapse of few hours could be seen on the plate of the fluoroscope and traced gradually to the point of the obstruction in the intestine. It was not necessary to take a skiagraph. The diagnosis in each case was verified. Encouraged by these results I have tried the pill myself just to see if it will pass freely, being not affected by the juices of digestion. It passed in two hours without any discomfort to me. The pill is prepared specially. Take a gelatine capsule No. 3, put a No. 4 shot into the same, close the capsule and cover the whole surface with a smooth layer of dental gutapercha, which must be applied warm, certainly. This way you will get a nice pill, which may be easily swallowed and the gastric juice can not act upon it. The shot being opaque to the x-ray will show plainly and may give you the direction in which the strangulation took place. Such a diagnosis is correct and may solve the problem of immediate operation, if necessary. I made few skiagraphs in succession, tracing the pill in my own body, and I assure you the procedure itself was very interesting.

Cedar Rapids, Iowa.

Lambert Pharmacal Co. has recently printed a brochure on the medical and surgical experience of the South African War, which was addressed to the Toronto Clinical Society and Canadian Medical Association, by Lieut.-Colonel G. Sterling Kyerson, M.D. The subject is an interesting one to physicians and the contents exceedingly instructive. A review of the nature of diseases which prevail in that country and a comparative mortality from the same nature of disease in other wars in other countries is given. This same attention is paid to the surgical aspect of the war. It appears from the tables that more doctors are now needed in war than surgeons, which is contrary to all previous wars. This seems strange in the light of modern ingenuity being liberally paid for inventions to more effectually injure and destroy human life. Some explanation for this great change may be made in diagnostic medicine furnished by the x-rays.

The Aristos Gold Mining and Milling Company give for reference the First National Bank of Denver and the firm of Patterson, Richardson & Hawkins, the company's counselors. Mr. Patterson is the newly elected U. S. Senator from Colorado. He has been Mr. Lamb's attorney for over twenty years. Mr. Lamb is president of the company. Read the advertisement in this issue.

THE AMERICAN
X-RAY JOURNAL.

Devoted to Practical X-Ray Work and Allied Arts and Sciences.

PUBLISHED MONTHLY BY THE AMERICAN X-RAY PUBLISHING COMPANY.

HEBER ROBARTS, M. D., M. E., Editor.

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All business matter should be addressed to The American X-Ray Journal Publishing Co., same address.

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VOL. 8. *ST. LOUIS, MAY, 1901.* *NO. 5.*

CONTENTS VOL. 8, NO. 4.

Observations on Crooke's Tubes, Etc.
Some Hints for X-Ray Workers.
Renal Calculus.
Efficient and Negligent Practice.
Determining Death by X-Rays.
Roentgen Society of the United States.
Roentgen Society.
Detecting Signatures by X-Rays.
Deplorable.
Laboratory of Prof. Bouchard.
How to Diagnose Intestinal Obstruction.
Unsolved Problems of Medicine.
Communication—Elihu Thomson.
Seehear.
The Crossing of X-Rays.

CONTENTS VOL 8, NO. 5.

Roentgen Society to Meet at Buffalo.
X-Rays Without Electricity.
Observations on Crooke's Tubes.
Skiagraph Admitted in U. S. Court.
Accurate Localization.
A Study of Static Electrical Apparatus.
Pence's Method of Locating a Bullet.
Roentgen Society of the United States.
Some Hints for X-Ray Workers.
The Coin-Catcher.
Roentgen Society.
Skiagraphs Admitted in Court.
X-Ray Laboratory.

W. S. ANDREWS, A. I. E. E.
Member Roentgen Society of the U. S.
Schenectady, N. Y

THE AMERICAN
X-RAY JOURNAL.

Devoted to Practical X Ray Work and Allied Arts and Sciences.

VOL. 8. ST. LOUIS, MAY, 1901. NO. 5.

TO ALL X-RAY WORKERS AND MEMBERS OF ALLIED PROFESSIONS, GREETING:

CEDAR RAPIDS, Iowa, May 6, 1901.

The Second Annual Meeting of the Roentgen Society of the United States will be held at Buffalo, N. Y., on September 10 and 11 at the University of Buffalo. The preliminary announcements will be sent out as soon as possible. A cordial invitation is extended to every x-ray worker, surgeon, physician, dentist, investigator, author on x-ray topics, inventor, skiagrapher or their assistants in hospitals, technical electrician, chemist, teacher of chemistry and physics, specialist and expert in electrology and radiology, etc., whether or not members of the Society, to be present at this meeting. Buffalo, on account of the Pan-American Exposition, is the ideal convention city, readily accessible by railroad from all parts of the United States and Canada. We understand that the railroad rates from all points of this country will be very low. The medical profession of the City of Buffalo is ever alert to make meetings interesting and our meeting, on account of the courtesy of the Dean and the Faculty of the University of Buffalo, will not only be the most scientific and instructive, but will add to the comfort and pleasure of the visiting members, their friends and families. The first meeting of our Society in New York City, was a phenomenal success in every direction. The work of the Society this year, will be again of a high order. Papers are promised by many leading men abroad and from this country, upon a great variety of subjects in electrology and radiology, both practical and theoretical, and any x-ray worker attending the meetings, will be fully paid in the information received. There will be offered advantages to the visiting members at our meeting for instructions in the x-ray work, that cannot be had under any other conditions. The Society earnestly hopes to have an exhibit of every part of x-ray apparatus of all makes, and complete assortment of skiagraphs of actual cases. The reports of the special committees, especially on standards, will be most interesting and instructive in a legal way and the success of the work of those at the head of our beloved profession, depends mostly on the cordial co-operation of every x-ray worker, every profession devoted to this branch of science and every maker of x-ray apparatus in this country. The membership of this Society ought to be greatly increased, when we consider that there are many yet outside of the Society, many of those who are diligent and honest in their purpose to help to relieve suffering and when possible to prolong life. This proves that much yet remains to be done in increasing this great agency for good. The meeting in Buffalo will be the proper stimulus. The social features of the meeting will not be neglected. The busy members and our friends will find the few days spent at the meeting not only instructive, but restful, in meeting our confreres, and at the Pan-American Exposition, an opportunity to study the great achievements of the science in all other branches.

Aside from the scientific and social features, there are matters of business to be considered, well worth the attention of every x-ray worker, matters affecting the welfare of every branch of our profession. We hope, therefore, that every man working with the x-ray, every friend of this new method of diagnosis, every honest worker of the science, will make an earnest effort to be present at the coming meeting.

In regard to exhibits, write to R. C. Adams, Secretary of the Committee on Arrangements, Drawer 963, Buffalo, N. Y.

To promote harmony in results and secure accuracy and give legal value to the x-rays, the Committee on Standards accepts gladly any device or report. The Chairman of this Committee, Dr. S. H. Monell, 47 West 27th St., New York City, invites all x-ray experts to make suggestions and contribute to the general good of the cause.

Applications for membership must be accompanied by $5. There is no initiation fee. The official organ, The American X-Ray Journal, free. For particulars write to the Secretary.

J. Rudis-Jicinsky, M. D.
Cedar Rapids, Ia.

X-RAYS WITHOUT ELECTRICITY.

It was announced last week at a sitting of the Paris Academy of Science that H. Curie, a chemist, had separated a new gas from radium. This gas is intensely phosphorescent and will glow for months in the dark. It was also announced that M. Nandon, a scientist, had found means of producing x-rays without electricity by exposing a metal plate to the rays of the violet end of the spectrum.

OBSERVATIONS ON CROOKE'S TUBES. ETC.

BY H. WESTBURY.

Read before the Roentgen Society of the United States, Grand Central Palace, New York City, Dec. 14, 1900.

[CONTINUED FROM PAGE 878.]

The Crooke's tube is quite as important as the apparatus in the production of x-rays, as at the present time it is the only practical way of producing the rays for medical use. Such tubes are, generally speaking, made of flint glass, although lead glass can be used, but is more opaque. Originally it was laid down as a fact that lead glass would not produce x-rays at all. Ordinary ruby glass is also opaque to the rays, and it appears that the rays will not pierce certain colors. The red-tinted glass used in some English tubes is not ruby glass but simply due to minerals in the glass not necessarily opaque to the rays. It is extremely interesting to watch closely the vagaries of various tubes after re-exhaustion on the pumps. Some will fluctuate in vacuum, one minute going very high and the next so low that no rays are generated. These fluctuations can sometimes be driven out of the tube by heating the anode to a white heat and then allowing it to cool off before again repeating the process which we call "curing" a tube. All the best vacuum tubes are treated in this way, as it has been found by experience that tubes exhausted too high on the pumps never give the results obtained from tubes taken off at a lower vacuum and then electrically cured. If I remember correctly our friend Dr. Rollins has demonstrated this fact in his interesting notes on x-light. Other tubes behave very curiously. Some will throw a peculiar patch of fluorescence in certain parts of the tube; others will be of high vacuum and give a reversed current, and the other week I even obtained a German tube with an aluminum ring in the center, which, after re-exhaustion, gave a reversed current at a very *low* vacuum; a phenomena I have never observed before. It is no exaggeration to say that no two tubes behave exactly alike, although, of course, tubes can now be made so uniform as to lead any outsider to believe there is no distinction in them at all. There is quite a difference of opinion as to the correct situation for the cathode, whether just inside the bulb or inside the terminal, and this difference seems to have been in existence for several years, as I remember reading an article two or three years ago claiming that the cathode inside the bulb was of no use for coil tubes, but immaterial for static current. Personally I have failed to find much variation, and am inclined to think that within reasonable limits any size cathode and any position gives about the same results, but at the same time I believe that a good deal depends upon the concavity of the cathode, and, of course, liability to puncture has to be considered in placing the cathode, more especially on a static tube. Theoretically, however, while it is probably true that a focus right on the center of the anode is best, yet the benefit obtained is so small that so long as the cathode stream impinges on some part of the anode disc x-rays are present in abundance. Sometimes one gets an old tube with the anode twisted and bent out of all shape, and even with a hole right through it, which yet gives magnificent results. Another curious phenomenon is the peculiar blackening of the glass bulb after continual use. Many explanations have been brought forward to account for this discoloration, but so far none of them seem plausible, and probably until we solve the exact nature of the rays themselves we cannot tell what causes this deposit on the bulb. One thing I can say, however, that tubes giving fine phosphorescence blacken less than others. It used to be considered that the more phosphorescent a tube was the better x-rays it would generate, but this cannot be proved, as I have many tubes with little or no phosphorescence giving as good results as those made out of the most luminous glass. This luminosity is also a very curious phenomenon. Sometimes it appears evenly all over the bulb, the glow lasting for a considerable time after the current is turned off. Sometimes it is only present in small portions of the bulb, and occasionally I have seen it represented by simply a luminous shadow of the anode thrown on the otherwise black wall of the tube. To the outsider the evolution of the present perfected form of Crooke's tubes from the type originally used shortly after the x-rays were discovered does not present very many features striking to the eye, but to those who have been closely following these changes they have improved very steadily every year. The original types of tubes were of the kind in which the cathode stream of rays was thrown on the glass of the tube itself. While this type of tube was at first successfully used, the necessity for a tube which would focus the rays soon became apparent. After numerous experiments with various contrivances for attaining this result tubes were produced with aluminum cathodes and platinum anodes, and these have held their ascendancy up to the present time. Since that date constant experimenting has led to something approaching a standard shape for Crooke's tubes. The bulb was gradually changed from the oval and tubular shape to globular, although some of the very earliest types were made spherical. The distance between the anode and cathode with which the best results could be obtained was gradually determined. The terminals were extended to meet the increasing efficiency of the apparatus used for the excitation of the tubes, which caused the current to spark across, and many minor details in connection with the sealing in of the terminals and proper supporting of them to enable a tube to be transported without danger of breakage were made. Of recent date we have the reinforcement of the anode with other metals to enable it to stand up against the heavy currents now used, and the endeavors to focus all the rays in a circle on the front wall of the tube so that none of them may be useless by passing out where they are not required. One of the earliest troubles met with in tubes was their tendency to gradually increase in vacuum, until at length they became so high that the current would not pass through them, and even if an enormous spark were used the resulting rays were so highly penetrating as to be of no practical use. This led to the devising of the adjustable vacuum feature, which is now so prominent in most tubes sold in this country. Originally ordinary potash was used enclosed in a small auxiliary tube and liberated by means of applying a match or Bunsen Burner. This lowered the vacuum certainly, but only for a few minutes, when it jumped up again as high as before. Many operators also cracked their tubes, owing to heating the auxiliary tube too much, and many present will remember the burned fingers which sometimes resulted. To meet this difficulty, the present types of adjusters were designed with a wire terminal, so that an electric spark can be discharged directly through the auxiliary tube, and better salts and combinations were obtained which regulate the vacuum a great deal better than formerly, but, of course, this is not yet by any means perfect.

Both osmium and iridium have been used for the anode, but both of these metals generate so much gas that it is very difficult to exhaust a tube containing them, and even then after use such a tube will continually run too low for the production of rays, in addition to which the cost is prohibitive for a commercial tube. I am inclined to believe that for some of the finer forms of x-ray work the tubes with water cooled targets may prove useful, but unless such a tube can be designed much cheaper than at present their cost is also prohibitive. I think it can be readily understood that the market for a $30 tube is a very restricted one when a really good tube can be obtained for a third of that price.

I particularly wish to bring before this meeting one point which I very much desire to impress upon tube purchasers generally, and that is the advisability of our trying to standardize American glass for Crooke's tube use. There is unfortunately at the present time a color fancy among many Crooke's tube operators who insist upon having tubes which give an apple green effect. Now it is a fact that this has nothing whatever to do with the strength of the rays given out by such tube, and tubes made of American glass giving a whitish or yellowish color illuminate a screen just as brightly as one made from the best green German glass. My reasons for raising this point apart from the patriotic one of using home-made materials, which, however, ought to have a little weight, are that the domestic glass is as a rule stronger and freer from blisters, cords, air bubbles, etc., which tend to make a tube liable to puncture and also, which I think is the most important reason for purchasers of tubes to consider, much more easily repaired. I think I can claim some little knowledge in this respect, and I unhesitatingly say that I have not yet seen a German tube which could readily be repaired without fear of the glass going to pieces on the pumps. There is something used in the glass which makes them particularly fragile when attempting to re-exhaust them, and in consequence of the defects, such as air bubbles, etc., as fast as one puncture is repaired another breaks out. On the contrary, with tubes made of the best domestic glass they can be repaired time and again indefinitely without trouble and are as good as new, and the cost of such repair is, of course, much less. Taking these points into consideration, I think it is quite time that users of Crooke's tubes understood that color to the eye means nothing and that what they want to get is, other things being equal, tubes which will be durable and, if punctured, such as can be repaired and made as new at the least cost. I am not in favor of using a larger bulb for a Crooke's tube than about 5 inches, as I do not think that there is any better definition or even field obtained by using larger bulbs. Of course, for very heavy sparks an 8 or 10 inch bulb is probably an advantage.

An interesting experiment with the double focus tubes on alternating current is to run them in multiple series, which can easily be done by wiring each of the two cathodes together. Of course, the field is somewhat enlarged, but as I have never taken a large radiograph this way I cannot say whether this arrangement is of much practical use. In multiple they do not run so well, and with single focus tubes, as a rule, there is no benefit obtained by using more than one tube at a time.

The use of a very high vacuum or "hard" tube is of very little practical utility, as, while the rays are enormously penetrative, the definition obtained is not distinct or clear, and for very delicate work, such as observing the lungs, etc., the definition has to be as clear as it is possible to obtain.

Dr. Lenard, of Philadelphia, has recently done some excellent work in the line of penetrating the inmost recesses of the organs and I have several times verified his published statements. The following is, therefore, interesting:

In cases of calculus a soft tube is required, as the rays must differentiate between the shadows of tissues less dense than the least dense calculus, and all calculi can be found. A soft tube is one having a low vacuum and best results are obtained from such a tube with a large volume of Roentgen discharge. For lumbar and pelvic pictures the vacuum requisite is equivalent in resistance to from one to two inches of spark in air as measured by a parallel spark gap. High wattage and not high voltage seems to be the necessary element in the current employed to energize a tube in such cases. Great difficulty is met with in obtaining such volume to penetrate these thicker portions of the bodies unless a regulating tube is used, which permits the required volume of electrical energy to be forced through a tube without altering its resistance eliminating the effect of heat, which in a soft tube either lowers the vacuum until it loses all penetration or highers it rapidly until the penetration is too great. It is this inherent tendency of a regulating tube that has been highly exhausted to regain its high vacuum after it has been lowered that makes it superior to an already soft tube that has never been high or hard. The vacuum of an initially soft tube will not remain steady while energy sufficient to develop the required volume of Roentgen discharge for soft tissue work is forced through it.

The subject of x-ray burns is to be treated in a special paper to be read at this meeting, but while the cause of them is still in dispute, I would like to state that I believe, in common with several other observers of tube phenomena, that they are only caused by certain tubes and that the trouble is in the tube itself, at what point I cannot, of course, say, but I firmly believe that there is some little difference which causes the rays to burn, or, more properly speaking, causes dermatitis. However, militating against my theory to some extent is the fact that Dr. Scott and other operators have found that the funnel focus type of tube which probably focuses more of the rays on one spot than any other type of tube, causes dermatitis after very short exposure, which would tend to show that the old theory of the more powerful the rays the more the tendency to burn is incorrect. I appreciate that there are probably a number of gentlemen present who are desirous of obtaining all the points they can on the methods of operating Crooke's tubes. I, however, feel that such hints can best be supplied by the various manufacturers exhibiting apparatus, each of whom can demonstrate such methods in connection with their own special apparatus and Crooke's tubes so as to be necessarily a great deal clearer than any advice I could give in a paper of this kind. I will, therefore, leave these questions open for demonstration on the machines during the meeting, but I would impress upon the amateur users of tubes the advisability of learning all the points they can on this subject, as it will preserve them from probably much expense in both punctures and patience if they understood thoroughly how to manipulate a tube correctly on their own type of apparatus, whatever that may be. One trouble is that a physician will purchase a set of x-ray apparatus and tubes and proceed to manipulate them without any real knowledge or care of the tubes. Everyone who starts on x-ray works should consider that it takes more than a few weeks practice to understand enough to do first-class work, a condition not always arrived at in a year. One of the objects of this Society is to disseminate knowledge amongst its members and aid them to a practical understanding of x-ray work. Personally, I shall always be very pleased to do what little I can to answer any queries on tubes or their behavior which members may wish to be informed upon, and I trust they will not hesitate to write me at any time on this subject.

In closing, I can only say that I sincerely trust to see very shortly every member of the medical profession recognizing the necessity of keeping up with the times and taking up x-ray work as a needful adjunct to his practice.

Harrison, N. J.

SKIAGRAPHS ADMITTED IN U. S. COURT.

In the United States Federal Court on April 9, at Chattanooga, Tenn., Skiagraphs made by Prof. Horner, of Cleveland, Tenn., were admitted and ordered by the court to be shown to the jury. The point was hotly contested. It was a $10,000 damage case by Mrs. Stinnett against the Southern railway. The Skiograph revealed the healthy and injured sides of the body, a precaution which should always be taken if the case is to be medico-legal.

ACCURATE LOCALIZATION.

Dr. John Macintyre in his presidential address before the Roentgen Society, of London, said:

> "The demand for accurate localization of foreign bodies and fractures, which is an absolute necessity, has been well answered in the form of practical methods based upon theoretical considerations previously demonstrated."

What do the surgical teachers and writers think of this saying, before a learned body, when they themselves have written upon the "inaccuracies of the x-rays?"

G. Wilbert made examinations of different drugs with the help of the x-rays and recommends the application of the same in all those cases where the microscope or the chemical analysis remains negative. The x-rays tell at once and without much trouble, if Aloe, for instance, contains any sand or not or if asafœtida was a clear and real article, etc.

A STUDY OF STATIC ELECTRICAL APPARATUS.

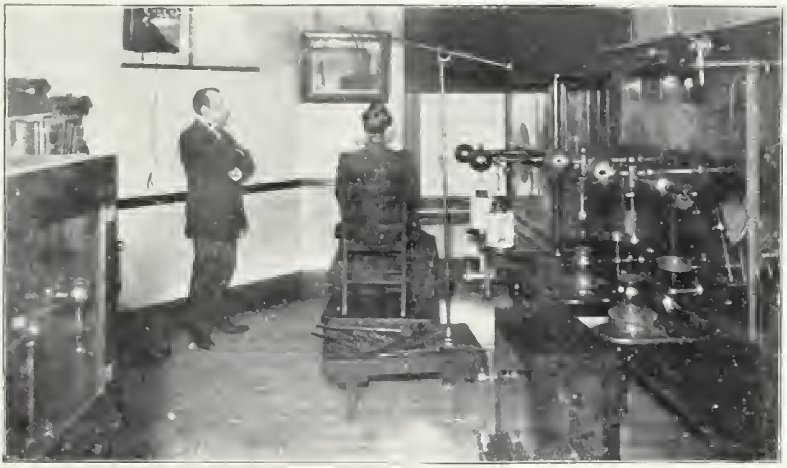
BY JOHN TOWNSEND PITKIN, M. D.

ARTICLE NO. 2.

Adventitious Plates.

In the short article of last month was briefly considered the oil immersion of the Leyden jar; the same subject will receive a little elaboration before passing to the digestion of other important improvements in static electrical apparatus.

The functional activity of immersed condensers may be facilitated by lining the bottom of the inside of the retaining vessel with a metallic plate or employing a shallow substratum of water as an electrifiable surface. The discharging rod or chain requires insulation to overcome the tendency to electrical loss and prevent contact with the glass surfaces of the jars; otherwise there is imminent danger of their being punctured by disruptive action, the glass fractured and the condenser ruined. It may be observed that through the employment of the oil bath as recommended the capacity of the condensers will be augmented, as is evinced by the brightening of the flash, heavier detonation, fattening of the spark and increased resistance to the mechanical propulsion of the apparatus. Stoppers of the Leyden bottles should be made of leather, glass, hard rubber, parafine, sealing wax or some other dielectric. Wood is too good a conductor of high tension currents to be employed in the construction of any portion of a static condenser. From either extremity of the static machine, extending a variable distance towards, and at the same elevation as the axle, between the alternate interspaces of the revolving wheels, firmly placed upon metallic supports, are the collecting rods and combs. The combs receive the electromagnetic energy from the revolving discs, the rods maintain the combs in position, and through co-operation with the fellows of the opposite side and the intervening air functionate as the electrified metallic surfaces of Leyden jars. It becomes apparent that the apparatus which we have considered as one large self-exciting condenser, is in reality formed of many small units, and that, while in action, the static machine becomes a row of Leyden jars operating and connected in simple multiple rela-



CORNER IN A STATIC ROOM.

Showing the Pioneer Twelve and Eighteen (revolving) Plate, Holtz Machines.

tionship to each other. In a well constructed machine these jars or segments are of uniform composition, symmetrical in arrangement, perfect in alinement, and of equal capacity; they unload themselves *in toto* through an outside condenser, consisting of the prime conductors, discharging rods, the surrounding atmosphere, and intervening air gap. If the discharging rods are slowly drawn apart the row of condensers will gradually accumulate more and more load, the number and strength of the bisecting lines of magnetic force increase, the strain upon the dielectric air between the sets of comb-holders of opposite sides becomes so great that it eventually gives way within the case, the collecting rods become vicarious discharging structures, and the apparatus is more or less completely short circuited.

The breaking down or magnetic point of saturation of the atmosphere will vary with (1) insulation of the axle, (2) amount of moisture in the air, (3) width of opening or interval between the revolving wheels, (4) the presence or absence of spark gaps or Crooke's tubes in the external circuit, the length of the former or the resistance of the latter, (5) intentional or accidental charging of surrounding objects in and of the apartment, (6) number and size of plates, (7) speed.

The condenser action and currents strength is necessarily very low in machines having wooden collars between the revolving discs, the woodwork forming a pathway for luminous convective discharges. It is obvious that such machines are not suited for the best x-ray work, because a tube of high vacuum requires a *strong* high-tension current for its *full* excitation.

With solid hard rubber washers on an axle clad throughout (except in the bearings) with sleeves of the same material, the capacity of the air and hence of the entire machine is much greater, and the electrical output is proportionately intensified.

One of our recent static machines built for practical and experimental purposes was exhibited by the makers to the members of the Roentgen Ray Society of the United States, held in New York City December 14, 1900. This apparatus has eighteen (18) revolving plates thirty-two (32) inches in diameter or ten condensers in accurate alinement. The axle has a hard rubber sleeve and massive collars made of the same material*. The air space into which the posterior comb-holders extend is limited by an extra or adventitious stationary plate, and is made to correspond in width to the other spaces used for a similar purpose. Because the neutralizing rod and posterior portion of the case are beyond the extra plate sparking from the collecting combs and rods to these structures is rendered impossible.

As the anterior space of the machine proper, where the first set of collecting combs functionate, is only limited by the front of the case, this space takes up a surplus magnetic charge during functional activity of the machine, and with a fifteen-inch spark gap, or a hard tube of equal resistance in series, disruptive discharges take place between the anterior set of collecting comb-holders. The remedy for this condition should be self-evident. A supernumerary revolving disc inclosing the anterior set of rods, so as to reduce their interspace to the diameter of the others employed for the same purpose will overcome the inequality. The strength of the entire set of condensers will then be perfectly balanced as a consequence of their having become of uniform capacity.

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*For a specimen of radiographic work of this machine see March issue of the JOURNAL.

Buffalo, N. Y.

Subscribe now for THE AMERICAN X-RAY JOURNAL. $3.00 a year.

STATE COLLEGE OF KENTUCKY, }
DEPARTMENT OF PHYSICS. }
LEXINGTON, Ky., Feb. 25, 1901.

Dr. Heber Robarts, Editor of The American X-Ray Journal, St. Louis, Mo.

DEAR SIR:—I have on several occasions used the following method of locating a bullet in x-ray work and with perfect success. Suppose the bullet to be embedded in the back at some point, K, Fig. 1. First locate it approximately with fluoroscope or by photo. Then attach a small shot to the skin at some near point, A. It will do just as well to put the shot at K, directly over the bullet. Next fasten a small triangular piece of lead to the film side of the photo plate at some point, A, Fig. 3. Now place the tube stand, holding the tube in position on the table and place the plate underneath with the marked point A, vertically under the x-ray source. Note the position of the stand, then remove it. Place the patient in position on the table and on his back, with the shot directly over the triangular piece of lead, being careful that the plate is not moved. Replace the tube stand in its first position on the table. The tube will now be vertically over A, Fig. 2. Make the first exposure to the x-rays. Then slip the stand about four inches, until the tube is over some point, B. Make the second exposure. When the plate is developed it will show the points marked by the shot and bit of lead at A, Fig. 3, and the two shadows of the bullet at C and D. With the film side

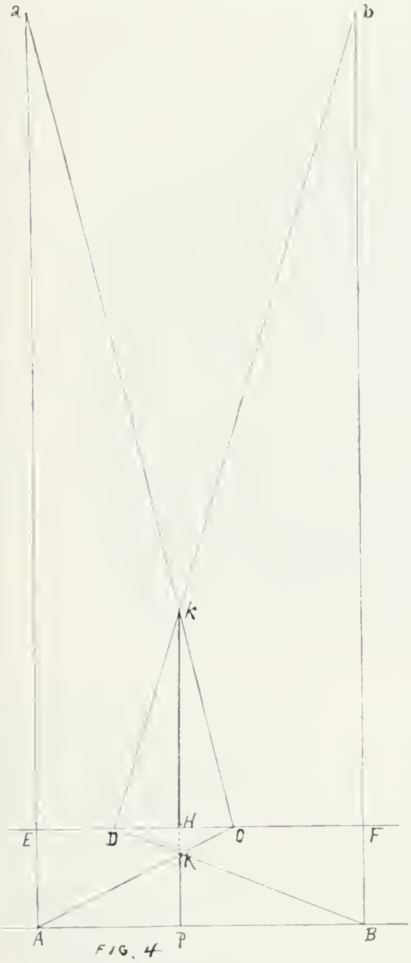

FIG. 4

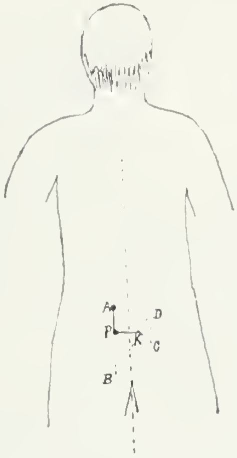

Fig. 1.

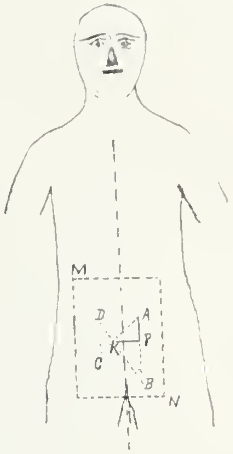

Fig. 2.

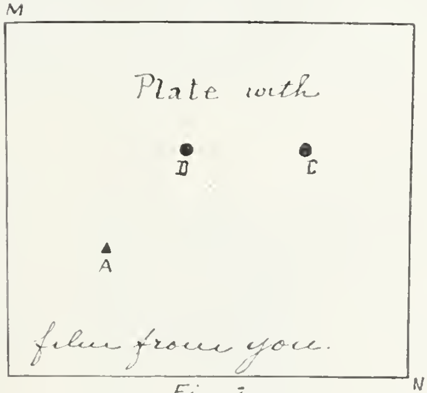

Fig. 3.

of the plate from you, transfer the three shadow points A, C and D, to a drawing board, Fig. 4. On the board draw a line through D and C. Draw a line through A parallel to D C, and on this line mark the second position of the tube at B. A B is the distance the tube is moved. At A and B erect perpendiculars Aa and Bb, and on these lay off Ea and Fb equal to the distance of the tube from the plate. Join A and C, B and D, a and C, b and D, and through k and K draw kP. K shows the position of the bullet in plane k in elevation, and kH is the distance of the bullet from the plate. Lay off the lengths AP and PK on the patient's back, Fig. 1. The point K will be directly over the bullet. The depth of the bullet will be kH, or kH less by the distance the point K on the skin is from the plate. I first used this method last October. The patient had been shot in the back about twenty years ago. I first found the bullet with the fluoroscope, but could not see it latterally so as to get its depth. When a plate was exposed as above and developed, it showed that the bullet had split into two parts, each piece giving a double shadow. One plate located both pieces simultaneously. One piece was removed next day.

To use this method successfully it is best, perhaps, that the operator should have some knowledge of Descriptive Geometry. The method is very accurate in both theory and practice. A high vacuum tube should be used and each exposure may range anywhere from two to five minutes.

I use an induction coil giving a 15-inch spark, and seldom fail to locate a bullet with the fluoroscope alone.

M. L. Pence.

[We very much appreciate the mechanical exactness Prof. Pence has found in locating foreign bodies. But with full credit given we can not see why the always ready fluorometer should not take the place of this or any other method thus far given. The fluorometer is always ready, simple to use and accurate in results.—Ed.]

ROENTGEN SOCIETY OF THE UNITED STATES.

ANNOUNCEMENT OF COMMITTEE ON ARRANGEMENTS.

The Committee on Arrangements for the next meeting of the Roentgen Society of America have secured, through the courtesy of the Dean and Faculty of the University of Buffalo, the use of as much of its building as we may require. The location is central, the room ample and on the ground floor. The date of the meetings will be Sept. 10 and 11 at the University of Buffalo, Buffalo, N Y.

The following rules and regulations in regard to exhibits have been adopted by the committee: Applications for space should be sent as early as possible to R. C. Adams, Secretary, drawer No. 963, Buffalo, N. Y., with particulars as to character of exhibit and space needed.

Exhibits may be consigned to Louis Staffeldt, care University of Buffalo, and all express and freight charges must be pre-paid. Owners of goods sent by freight who wish them transferred to place of meeting on arrival, must notify the secretary and send him the pre-paid bills of lading. The cartage will be at expense of owners.

Exhibits are wholly at risk of owners, and should be unpacked and installed by them not later than Sept. 7.

Alternating current 104 volts, single phase, 60 cycles, and direct current 110 volts, will be available, also dark room for photographic purposes. All exhibits must be removed by Sept. 13.

Edgar B. Stevens, Chairman.
Roger Cook Adams, Sec., Drawer 693.
Dr. James W. Putnam,
Dr. Elmer E. Starr,
Dr. Rennick R. Ross,
Committee.

A GLIMPSE OF THE PAN-AMERICAN EXPOSITION. — PERGOLA AND ENTRANCE TO MIDWAY

COPYRIGHT 1900 BY THE ELECTRIC TOWER PAN AMERICAN EXPOSITION CO.

SOME HINTS FOR X-RAY WORKERS.

BY BENJ. F. BAILEY, M. A.

(CONTINUED FROM PAGE 882.)

The tube is connected as usual, with the discharge rods of the coil and the connections made with the mains as before described. The platinum point is arranged so that only a small portion of it extends into the liquid. The switch is then closed and the point screwed down until the tube attains the desired degree of radiation. The spark length required is generally not great, as a six-inch discharge from the Wehnelt Interrupter will light up a tube that will not yield to a 12-inch discharge produced in the ordinary way. Very few of my exposures, even of thick parts of the body, require more than five inches of spark length. A very practical result of this is that a small coil will do the work, usually requiring one several times as large.

To use the full power of a large coil it is necessary to use a tube made especially for this purpose. These are usually made with an extra heavy anode, and with some arrangement for carrying off the heat generated there. A tube of this type is shown connected up in Fig. 3. (See page 880.)

RADIOGRAPHY.

The greatly increased brilliancy and penetration obtainable with the Wehnelt Interrupter, brings up considerations concerning the proper degree of radiation, which do not so strongly present themselves when the ordinary interrupter is used. Some writers seem to think that a tube can not be too bright; that the stronger the radiation the better the picture that can be made. This is all wrong. Any one having even a moderately powerful outfit, can convince himself of its falsity. Let him put a large bone button in a purse and observe it through the fluoroscope. With the tube giving off a feeble radiation the outlines of the purse can be seen, but no trace of the contents. On increasing the current the button will appear with the outline of the purse still evident. A further increase of current will cause the leather of the pocket book to disappear, the button still remaining black and distinct as before. If the radiation be pushed to the highest possible point the shadow of the button, even, will fade away.

An x-ray outfit is not necessary to demonstrate this point. A gas jet, a piece of window glass and a wall are sufficient. Holding the glass near the wall with the flame turned very low, nothing can be seen. With a small flame the shadow of the glass becomes distinct, but on turning on more light it will completely disappear. The analogy is perfect, as an x-ray picture is merely a shadow picture.

We have then, four distinct stages, which, however, merge into one another, and the one we would pick out to photograph the pocket book would depend upon what we wished to show. The first and the last would rarely be used. The second stage would be employed to show folds in the leather of the pocket book; the third, if the outline of the button were wanted.

With a powerful outfit this same thing can be shown with the hand. If a picture is taken with such a powerful radiation that the bones appear white and transparent, it is evident that the picture will be entirely lacking in contrast. Shortening the exposure does not remedy this. The proper degree of radiation is found by gradually increasing the current, keeping the fluoroscope at the distance at which it is desired to take the picture, until the flesh seems to drop away, leaving the bones as black as before. Anything more than this will show too little bone, anything less, too much flesh.

The presence of a bullet or other

piece of metal in the bone itself would modify this. Here it would be advisable to use a much stronger radiation, to show the contrast between metal and bone, instead of between bone and flesh.

On the other hand, if we wish to show the presence of a growth of only slightly greater density than the flesh, the radiation must be much weaker, the adjustment must be carefully made to get any contrast, and the exposure must be short. Fig. 5, which is a picture of the heart in a living subject, is of this class. Here the radiation used was certainly not over half the maximum obtainable from the tube. The distance from tube to plate was 14 inches, and the exposure only two minutes. The Wehnelt Interrupter was used with the direct current. This is without the use of the screen, as are all the exposures given here. The contrast is excellent. The heart is seen near the center of the picture. The edge is, of course, blurred on account of the heating. The diaphragm shows in the lower right-hand corner, but is, of course, blurred also. The ribs, which show, are on the back of the body, while the plate was at the front. They show very good definition, considering the distance they were from the plate.

In photographing the knee joint, shoulder, pelvis, etc., a much stronger radiation may be used, as the lines here are thick enough to cast decided shadows even with the strongest obtainable radiation. There is little danger of making the exposure too long. The picture of the shoulder, Fig. 6, is of this class. The exposure was three and one-half minutes at a distance of twelve inches.

EXPOSURE.

A great deal of misunderstanding exists in regard to exposure. I believe that there is a definite limit to shortness of exposure and that in many parts of the body this limit has been reached. Some comparisons with ordinary photography make this clearer. As is well known, in taking an ordinary photograph, the exposure may vary within very wide limits. I have developed a picture which was accidentally exposed about one hundred times too long and secured a fair negative, and on the other hand almost all snap shots are under exposed. In x-ray work no such latitude exists. An exposure must generally be within twenty-five per cent of correct to obtain a picture worth much. There must be a fundamental difference between the two processes. I think it is this. The x-ray picture corresponds to a *print* taken from an ordinary negative, the object photographed taking the place of the negative, and the x-ray light being used instead of ordinary light. In making a print the exposure must be just right, so also with the x-ray picture.

The analogy holds in other ways. The skillful photographer prints his weak negatives by weak light, and uses direct sunlight for dense strong negatives. The importance of the same thing has just been pointed out for x-ray work. What we wish to obtain in our negatives is, primarily, contrast. In taking a picture of a hand, for example, the plate outside the hand should be decidedly black, the flesh almost as dark, and the part under the bones comparatively clear. Now what we want is just enough exposure to blacken thoroughly the exposed parts of the plate. If the radiation is of the proper intensity, as has been explained, a good negative will be secured. The bones will show clearly and the flesh will be penetrated rapidly so that it barely shows. Less exposure than this fails to blacken the "high lights" properly, more causes the part under the bones to be affected too much and contrast is lost.

With this understanding we get a new light on the subject of short exposures. The only way to shorten the exposure is to increase the radiation, but this corresponds to a photographer using very thin negatives and exposing in a strong light so as to make his prints more rapidly. In each case, there is a happy medium which must be used to get the best results. It is entirely possible to take a picture of the hand in ten or fifteen seconds, but the picture lacks contrast. If, on the other hand, the tube is so dim that it requires five minutes exposure the flesh will show too strongly and there will be no detail in the bones. If the radiation is at the best point, a hand will acquire one to two minutes.

It will be seen that no mention is made of the distance. This takes care of itself. If the radiation is right it does not matter how it is obtained, whether by varying the current used or the distance from tube to plate. The law of squares does not hold in the sense that we can double the distance, expose four times as long and get the same kind of negative. In the mere matter of blackening a plain plate, it doubtless does hold.

In photographs of the knee joint, pelvis, and such parts where the thickness of bone is great compared with the thickness of flesh, we may use the most powerful radiation and give long exposures, as the bony parts are penetrated very little. This is, of course, assuming that it is the bony structure that we wish to show. If a tumor or other soft part be the thing we wish to get on our plate the radiation should be weaker and the exposure shorter. I have made a good radiograph of a growth that did not show at all with the fluoroscope. On the other hand, to show a bullet embedded in the bones of the knee we could hardly expose too long or use too strong a radiation.

Good pictures through the chest are hard to obtain, because the thickness of the ribs and other bony parts is slight compared with the thickness of flesh. An under or an over exposure here will spoil the picture. In x-ray pictures of small animals the radiation must be weak and the exposure fairly short.

In any x-ray work the tube should be at least as far from the plate as the diagonal of the plate. There are two very good reasons for this. There is always some distortion in a radiograph and this becomes very marked if the tube is near the plate. In the second place, if they are too near together, the distance to the center is much less than to the edges. The amount of radiation varies inversely as the square of the distance and this causes the edges to be very much less exposed than the center. Moreover, the rays striking the edges and corners, do so at an angle from the perpendicular, and the radiation must be multiplied by the cosine of this angle to get the useful effect. Making this out for the case when the distance is equal to the diagonal of the plate, we find that the corners receive only 72 per cent of the radiation at the center. If we double the distance, the proportion increases 90 per cent. It will be noticed that the bone of the arm is less clearly defined at its corner end than higher up. This is due to the smaller amount of radiation received at the edge of the plate.

DEVELOPMENT.

This is too large a subject to treat here, and the process can be found described in any manual of photography. The ordinary method is used except that a large amount of restrainer (K. Br.) is used so that the development is slow, frequently taking twenty minutes or more. If possible an operator should do his own developing, as he can in that way more readily tell where he has made his mistakes. He also knows the conditions under which the exposure was made, and can regulate accordingly.

I should strongly advise any one who has access to a commercial circuit to try this method, particularly if alternating current is available. It will increase the output of a coil many times.

Ann Arbor, Mich., January 4, 1901.

THE COIN-CATCHER.

In the grand old *Medical Record*, March 16 ult., there is an article by A. E. Isaacs, M. D., entitled, "A Whistle in the Esophagus." We are very sorry that Dr. Isaacs and Dr. King, to whom he refers, were not close readers of The American X-Ray Journal. If they had been, great suffering and surgery would have been spared one patient, delay and anxiety in the other and space occupied in the *Record* for a more instructive article.

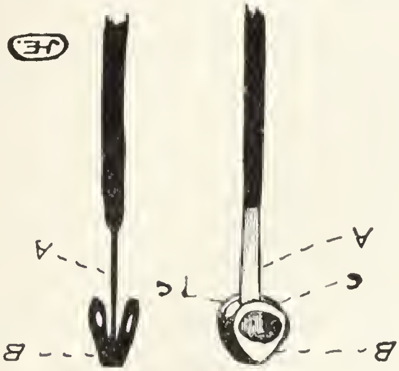

Fig. 1.

In an original article which appeared in The American X-Ray Journal, Vol. 6, No. 2, Feb., 1900, by Dr. John Hall-Edwards, Birmingham, Eng., drawings of the Coin-Catcher and its application were diagramatically given. We reproduce the cuts here for the benefit of the newer readers.

The Coin-Catcher, Fig. 1, is absolutely certain to achieve the results for which it was designed if properly used. It consists of a whalebone stem, in the ends of which is fixed a piece of watch-spring, A. On the ends of this, on a loose hinge, is fixed a miniature anchor, which moves freely from one side to the other. When this is passed down the gullet, which contains the coin, and passed through the obstruction, one of the free arms (cc) pass beneath and behind the coin, so that when the instrument is withdrawn one arm grips the coin and brings it up. Fig. 2, shows the method in which the instrument acts. A, coin-catcher. B, coin.

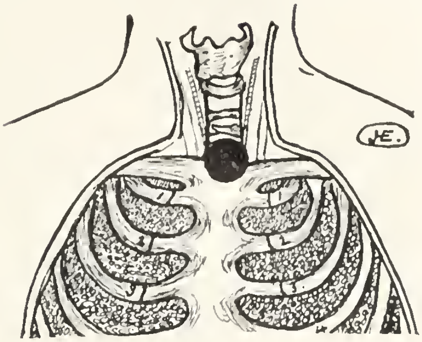

Fig. 2.

The reason the coin-catcher fell into disuse is that so little discomfort followed the immediate swallowing or lodgement of the foreign substance that it was believed to have gone into the stomach.

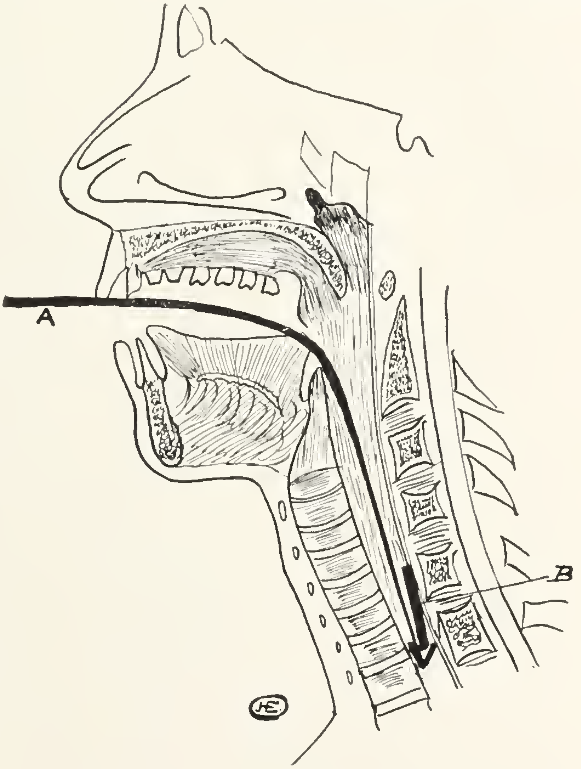

Fig. 3.

In about every instance the coin is situated on a line with the top of the sternum. In every instance also the face of the coin is turned forward. This should not be forgotten. In the case of a whistle of the small tin toy variety, the situation is the same and the application of the instrument for its removal is the same. It should be remembered that these foreign bodies may remain in this situation for a long time without discomfort, but that they do ultimately slough through and set up protracted coughing, causing death from a septic pneumonia, simulating phthisis. Before the introduction of the x-rays, many patients died without the cause having been discovered. The use of the x-rays now instantly determines the cause and saves the infliction of knife surgery.

ROENTGEN SOCIETY.

The following notice, made by Professor Monell, Chairman of Committee on Standards, appeals to all persons whomsoever that have any knowledge on this subject; and commends itself especially to medical men having interest in the attainment of more knowledge. Write to Dr. Monell and give expression on one or more of these subjects.

COMMITTEE ON STANDARDS.

DEAR SIR:

To promote uniformity in results and to secure accuracy and give legal value to the evidence of x-rays, it is necessary to standardize methods of doing the work. To this common benefit all x-ray experts are asked to contribute for the general good of the cause. You are therefore invited to write me your best suggestions on such of the following points as you can offer advice upon:

A standard uniform nomenclature for the principal terms required.

A standard form of record-blank for briefly filing reports aud indicating all essential details of the exposure.

Standard of efficiency for tubes.

Qualities which a standard x-ray photographic plate should possess.

Qualities which a standard x-ray fluoroscope screen should possess.

Standard handle for all x-ray tubes so they will fit a standard tube-holder.

Standard tube-holder to fit uniform standard tube-handle—adjustable, rigid, holding tube without vibration—and convenient for general use.

Standard position of tube for correct shadow.

Standard distance of anode from plate for standard x-ray exposures.

Standard exposure times for chief parts of the body with a standard radiance.

Standard measure of different degrees of x-radiance.

Standard "skiameter."

Standard x-ray examination table, adjustable for all parts of the body.

Standard method of posturing each part of the body for a standard picture.

Standard means of fixing parts immovably during a standard exposure.

Standard complete definition of what a "standard exposure" should be. (Of medico-legal value.)

Standard land-marks to be pictured in the negative as inherent proof that a standard exposure was made—(a medico-legal necessity).

Standard method of localization for both "skiagraphy" and "fluoroscopy," which shall be the most practical, quick and uncomplicated.

Standard technique for picturing correct relation of bones and joints.

Standard technique for picturing details of any kind sought.

Standard technique for picturing contrast for diagnosis of soft parts.

Standard technique for picturing the different calculi, vesical, renal and gall-stones.

Standard technique for x-ray dental diagnosis.

Standard technique for x-ray eye work.

Standard technique for x-ray heart and lung diagnosis.

Standard treatment of plates to develop uniform results.

A standard leaflet of brief directions which the physician who does not do his own developing can send with his plates to any fair photographer as a ready guide to proper treatment of an x-ray negative to secure the picture.

Standard technique for therapeutic administration of x-rays with proper precautions.

You are invited to supply any omitted detail which you believe should be standardized. Will be pleased also to have you select one or more features of the above list in which you have had special experience and make a careful report upon what you regard as the proper standard to officially adopt. A reply is desired in about two weeks. In offering suggestions about standard working methods, postures, special devices, apparatus, etc., it is desirable that you send explanatory camera-photographs illustrating the details for comparison. Thanking you for your professional co-operation in behalf of the committee, I remain,

Fraternally yours,

S. H. Monell, M. D.,

Chairman of Committee on Standards.

47 West Twenty-seventh street, New York City.

SKIAGRAPHS ADMITTED IN COURT.

On April 9, in the United States Federal Court, at Chattanooga, Tenn., skiagraphs made by Prof. Horner, of Cleveland, Tenn., were admitted and ordered to be shown to the jury.

In the personal injury case of De Forge vs. The New York, New Haven & Hartford Railroad Co., the Supreme Court of Massachusetts remanded the findings of the lower court and orders the admission of evidence of an x-ray plate by the plaintiff.

It took a long time for the Jenner discovery to become popular. The greatest lights in the medical profession decried its use and many held to their views till death. Scarcely can a physician be found nowadays, so unlearned or untutored that vaccination is opposed by him. Owing to the telegraph, the rapid mail service, the press and other rapid methods of diffusing knowledge, the Roentgen rays will not be hindered through so many years with so many obstructionists. The conquering influence of the x-rays is already felt throughout the world, and the "sages of maturity" standing in the way, are brushed aside into a class of their own known as the "owls of old ways."

The discussion of the "inaccuracies of the x-rays" is always timely. It is so because this is a science with an applied art more useful in diagnostic medicine than any discovery in any previous century. But a physician has no professional or human right to discuss its inaccuracies unless he understands its accuracies. If he only knew the evil effects of morphine he would do well to let the drug alone and the entire profession of medicine. This is not a mooted question,

Pan-American Exposition.

YOU are invited to call at our Exhibit of Ophthalmological and Electro-Medical Apparatus in the Liberal Arts Building at the Pan-American Exposition at Buffalo.

Special features of our exhibit are the ***Haab's Giant Magnet, sectional models,*** showing the mechanical and optical construction of the ***Skeel Perimeter*** and the ***Meyrowitz Model Javal-Schiotz Ophthalmometer,*** also the detailed process of the grinding of lenses and of the manufacture of ***Eyeglasses*** and ***Spectacles*** from the rough material to the finished product.

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it is a simple question of education.

Those who have read The American X-Ray Journal understandingly, since December last, inclusive, and the reports therein of the proceedings of the Roentgen Society of the United States, may have the satisfaction of knowing that they have the best and most useful information upon this great subject.

X-RAY LABORATORY.

The establishment of an x-ray laboratory in St. Louis has been expected for some time. It is strange that the location has not been sought before, since this is the home of The American X-Ray Journal, the beginning or origin of the Roentgen Society of the United States and the fourth largest city in America.

There are several very good x-ray machines here and they are fairly well under the control of their respective operators, but in no instance have these workers prepared themselves to do the work the present stage of the science demands. The profession, the doctors of medicine as well as the doctors of surgery, require more than the simple flat shadow without detail. They want and must have a picture that will show more than the solid anatomy, more than the simple stone or bullet stripped of surrounding detail. They want and must have more than this. They must have some evidence of the correctness of the picture. This has not been done in St Louis except in the most limited sense. Again, the doctor wants a picture made without fuss and loss of time. When the patient is sent or accompanied by the doctor there should be no delay, and if the doctor desires to see the plate, it can be made ready for him in the dark room in a few minutes. Another thing presents itself very forcibly to every surgeon and often to physicians in the practice of medicine only—the use of the ray

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at the bedside. It is found quite frequently very inconvenient, if not wholly inexpedient, to move the patient from the room. With the arrangements now being effected, all of these obstacles will be met.

Mr. M. E. Parberry has been directing his attention to the science of radiant matter, and of late of the practical uses of the x-rays. He is a young man of rare ability. Without stint of money he is fitting an x-ray laboratory in the Chemical Bld'g, St. Louis, certainly not surpassed for completeness in America. The American X-Ray Journal congratulates him upon the location, the city, and the time, and bespeaks for him abundant success.

A good deal of money is required to establish such a laboratory, but we do not believe too many can be installed. They are in demand, and every city in the land should imitate this worthy effort. In Madrid, Spain, $50,000 was put in an x-ray laboratory following the Spanish-American War, and it has paid the investors. We are confident that Mr. Parberry will be handsomely rewarded.

Begin your subscription to The American X-Ray Journal in Dec., 1900, and obtain all the matter of the Roentgen Society of the United States.

REMOVAL NOTICE.

On May 1, 1901, we will remove to the S. E. cor. 59th and Wallace Sts.

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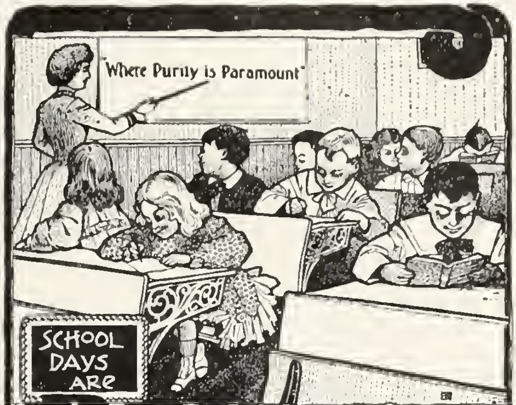
350 Dearborn Street, Chicago.



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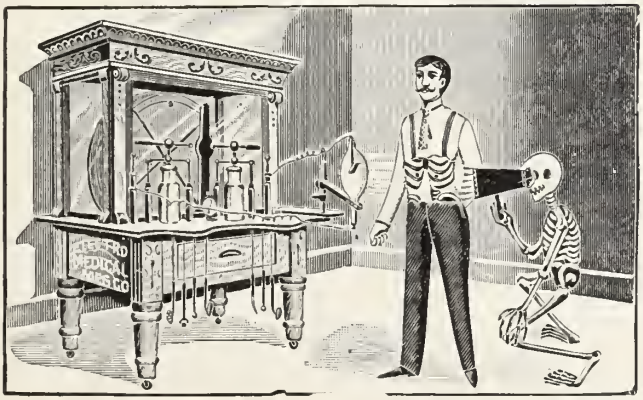

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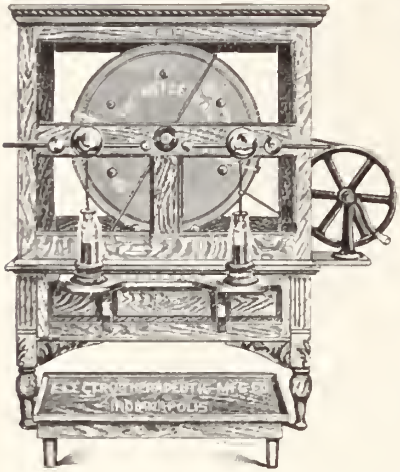
Nos. 2, 10 Collins Block, Lima, O. **H. L. BENNETT, M. D., M. E., Secretary.**



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Devoted to Practical X-Ray Work and Allied Arts and Sciences.

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HEBER ROBARTS, M. D., M. E., Editor.

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All business matter should be addressed to The American X-Ray Journal Publishing Co., same address.

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VOL. 8. ST. LOUIS. JUNE. 1901. NO. 6.

CONTENTS VOL 8, NO. 5.

Roentgen Society to Meet at Buffalo.
X-Rays Without Electricity.
Observations on Crooke's Tubes.
Skiagraph Admitted in U. S. Court.
Accurate Localization.
A Study of Static Electrical Apparatus.
Pence's Method of Locating a Bullet.
Roentgen Society of the United States.
Some Hints for X-Ray Workers.
The Coin-Catcher.
Roentgen Society.
Skiagraphs Admitted in Court.
X-Ray Laboratory.

CONTENTS VOL. 8, NO. 6.

Skiagraphy in Oral and Dental Surgery.
Shield for Prevention of X-Ray Burns.
Improved X-Ray Tubes.
Inaccuracies of the X-Ray So-called.
The X-Ray in Quackery.
Mississippi Valley Medical Association
Seek and Ye Shall Find.
Trigonometry in X-Ray Work.
Forgeries in Art Proved by X-Rays.
Bullet in Hip Joint.
Becquerel Rays.
Committee on Scientific Research, R. S. U. S.
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THE AMERICAN
X-RAY JOURNAL.

Devoted to Practical X Ray Work and Allied Arts and Sciences.

VOL. 8. ST. LOUIS, JUNE, 1901. NO. 6.

SKIAGRAPHY IN ORAL AND DENTAL SURGERY.

BY WESTON A. PRICE, D.D.S., M. E.

Delivered with Stereoptican Views before the Roentgen Society of the United States, Grand Central Palace, New York City, December 13, 1900.

There is no field of application in which the Roentgen Rays will bless so large a number of mankind as in dentistry.

The serious lessons and deformities of the teeth and oral cavity and adjacent parts are usually deep seated and their source and even location frequently entirely obscure. For example, what is the cause of this chronic empyemia of the antrum? The lady is about 70 and the case has had skillful treatment for a couple of years. You see quickly the cause in this lanternslide (Fig. 1.) It is a piece of a root partly perforating the antrum and which was buried deeply under the soft tissues. The Roentgen Rays have a much wider range of application in antrum troubles than has been recognized. This next case, (Fig. 2) is of special interest because a malpractice suit was brought against a dentist claiming that in extracting the badly decayed roots of a molar tooth the operator forced one of them through into the antrum causing an acute empyemia. This skiagraph shows clearly the antrum, but there is no root in it. This next slide, however, (Fig. 3) shows clearly the cause of the trouble which is the imperfect root filling in the bicuspid. As you see the chamber from which the pulp of the tooth has been removed has not been filled to the apex of the root. This almost invariably develops an abscess, and which in this case, as frequently occurs, has broken into the antrum. All the surgeons in the audience know the necessity of draining the antrum if possible from its most dependent or lowest point. But how can this be determined clinically for the lowest point has not a universal or definite position? For example, in this case (Fig. 4) the lowest part of the floor of the antrum is between the first and second molars, but there is an anterior chamber or department separated by a high partition, the lowest part of which is over the first bicuspid. Observe how the roots of the molars penetrate the antrum and hence how easy for an abscess at the apices of these roots to drain into it. In these cases the dense plate of bone forming the floors of the antrum is carried up over the apices of the roots, as for example this handkerchief when placed over this pencil forming a cone which in case of an abscess of this root draining into the antrum would probably be perforated at its apex. Suppose this first molar to be extracted to drain the antrum it would remain full of fluid to the level of the apex of this cone, while a perforation into the antrum through its buccal wall between the roots of the first and second molar would produce the desired result and save a valuable tooth. And right here

I must protest against the common practice of sacrificing valuable teeth for this purpose. It is not necessary, for the above operation is much better. This particular case was skiagraphed to determine the location of a piece of a needle which had been broken by the patient in the tooth and it was thought to have been forced through the apex into the tissue as it could not be felt inside the tooth. The skiagraph shows it plainly within the tooth. Notice the position of the lower part of the floor of the antrum in this next case (Fig. 5.) It is between the first molar and the bicuspid. This is of special interest because one of the bicuspids had never erupted and the patient had a deep seated abscess in the cheek with a fistula over the cuspid and into which a lead wire was placed for skiagraphing. The abscess had been previously diagnosed as coming from the missing bicuspid, but the skiagraph shows it to come from the lateral incisor, the apex of which is badly absorbed and its pulp dead while the suspected bicuspid has never formed.

The next (Fig. 6) shows another case of obscure antrum trouble which evidently comes from a putrescent root canal and abscess of the bicuspid. Notice how low the floor of the antrum is at its lowest part. These are only a few examples of antrum complications. Frequently the antrum becomes enlarged in a particular direction by the suppuration and by skiagraphing both sides at the same angles the extent of the absorption can be determined. By this means the exact location and boundaries of an abscess in the process resulting from putrescent pulps can be determined and after they are very obscure even though producing great disturbance as in this case (Fig. 7.) The patient had suffered for about three months from an obscure neuralgia and an examination of the teeth by different dentists revealed nothing abnormal. Several skiagraphs were taken of the teeth on the side affected and this blind abscess was found on the first inferior left bicuspid which, when treated entirely and permanently, cured the neuralgia.

Sometimes these abscesses produce very extensive destruction of tissue, as for example in this case (Fig. 8) where the lighter area shows the extent of the abscess in the bone around the lateral incisor. There is no necessity for extraction in these cases. Of course, the abscess must have drainage and have the irritant removed and then the treatment is very simple. This case had been drained through the root canal which, as you see, left the abscess more than half full of pus all the time. The most dependent point is that marked X. The abscess was perforated at this point and thoroughly sterilized and stimulated and the root filled at once. The cure was rapid and perfect.

The location of the irritant producing these abscesses is often very hard to locate, as in this case (Fig. 9) where the light area shows the extent of the absorption of the bone caused by an abscess from diseased root. The abscess had its fistula beside the second bicuspid and was treated accordingly. The dentist in charge extracted the first bicuspid because it was tender to concussion, but finding it all right replaced it. This radiograph shows the trouble to come from absorption of the apex of the lateral and the case was treated accordingly by amputating the apex of the lateral root with excellent results. Of course, drainage was secured at the lowest point of the abscess. Nature soon fills in these large abscess cavities with new bone when the irritant is removed as you will see by a radiograph of this same case three months later.

Cleveland, Ohio.

TO BE CONTINUED.

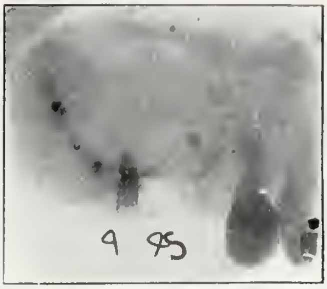


FIG. 1.

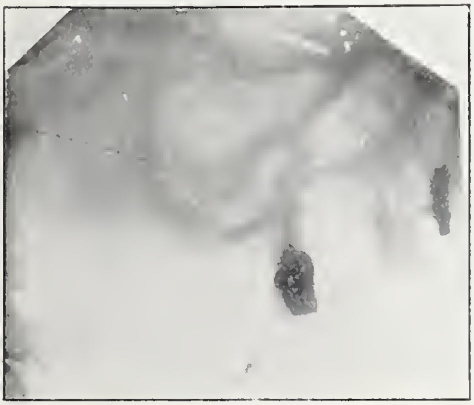


FIG. 2.

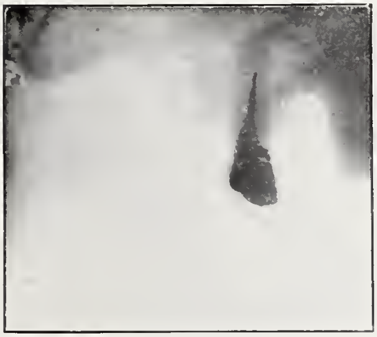


FIG. 3.

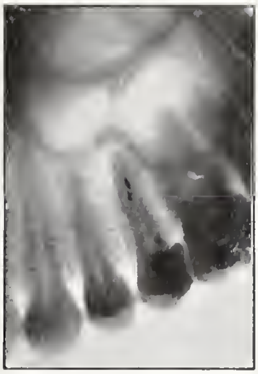


FIG. 4.

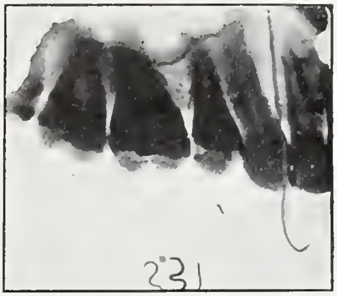


FIG. 5.

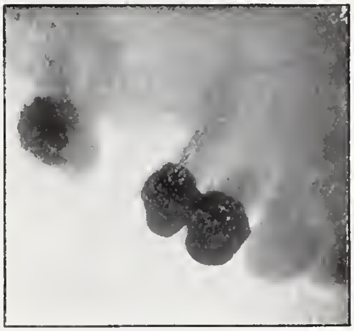


FIG. 6.

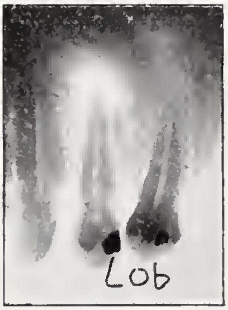


FIG. 7.

SHIELD FOR THE PREVENTION OF X-RAY BURNS,

and a Dark Chamber for the Tube, Combined.

BY G. E. PFAHLER, M. D.,
Assistant Chief Resident Physician and Skiagrapher to the Philadelphia Hospital.

The frequency of x-ray burns has been lessened in proportion to our knowledge of the causes producing them. Their insidious onset and obstinate recovery, however, should induce the use of every possible means for their prevention.

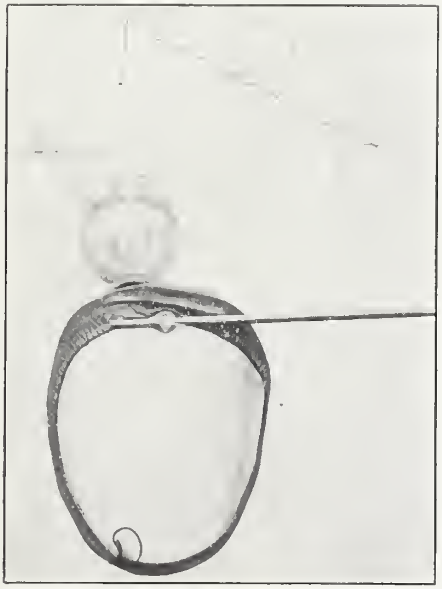


FIG. 1.

For some time past the interposition of an aluminum shield, grounded by a wire to the steam pipe, has been recommended. In this paper I wish only to present briefly a simple and convenient method of applying this principle, which may be of interest to those doing much work in this line. This method, with a little modification, can surely be applied to any tube holder.

It consists of a sheet of thinnest aluminum, cut circular, ten inches in diameter, the cost of which is trifling. A hole one-half inch in diameter, is cut about one inch from the edge and passed over the little clamp that grasps the horizontal arm of the stand. The washer having been filed sufficiently to allow for the thickness of the aluminum, is replaced and the shield fastened in the upright position in front of the tube. The shield may be bent convexly about the tube, as seen in Fig. 1.

It will now keep its relative position, no matter how the tube is adjusted, and needs no further attention from the skiagraph. Being attached to metal, the stand itself needs only to be grounded by a wire to the steam pipe. Since this will now require no special attention from the operator, the shield will always be in use and thus protect the patient.

Should the skiagrapher desire to use the tube for therapeutic purposes, the thumb-screw is loosened and the shield allowed to drop downward as seen in Fig. 2, which only requires a few seconds.

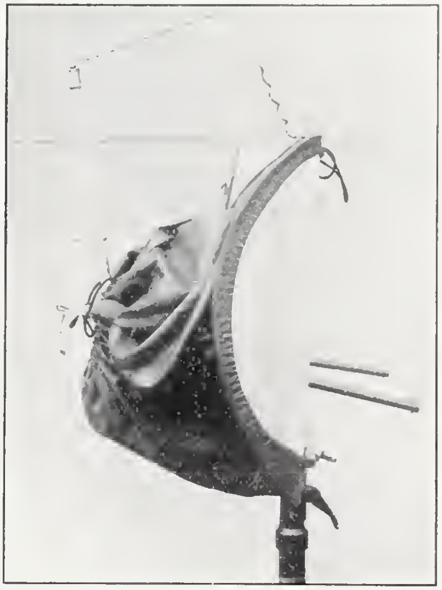


FIG. 2.

I find the fluorescent screen offers many advantages over the fluoroscope. It is less clumsy, and can therefore be more easily adjusted to the part studied, in its various positions. It enables a number to see the same object at the one time, and gives the skiagrapher an opportunity to point out the different lesions as they are presented. This makes it especially useful for class demonstrations. Its use, however, requires a dark room. Daylight may be excluded by blinds, etc. The ordinary light from the tube may be excluded by attaching a piece of dark cloth, preferably silk, to the edge of the shield, just described, and bagging it over the tube by means of a draw-string, as seen in Fig. 1. This can be adjusted or dropped in less than a half minute.

The whole arrangement is so simple, convenient and inexpensive, that I feel justified in presenting it to the profession, with the hope that it will give oth-others equal satisfaction.

Philadelphia.

IMPROVED X-RAY TUBES

It is reported that a Welsh electrician has so modified the x-ray tube the raidiant matter will do the work desired for skiagraphy from one tube, while the other is too soft for any skiagraphic work, but acts as a modifier of the injurious "burning rays". It is probable that a method is adopted for conducting away wasting streamers about the active tube and there is nothing new in the principle, only in the method.

The Provost, Charles C. Harrison, of the University of Pennsylvania, at Philadelphia, has sent out an illustration of the new Laboratory of Medicine. This building is said to be the most complete for the purposes for which it is intended of any in the world. This structure, for this high purpose, is most timely, since the demand is fast growing for greater research in physical laboratories. This is the oldest Medical University in the United States and being richly endowed can afford to take the anticipation step.

INACCURACIES OF THE X-RAYS SO-CALLED.

Dr. W. W. Grant of Denver, Col., has been fortunate enough in a recent article to lay the blame on others for saying the x-rays is "inaccurate and unreliable." But the doctor shows decided leaning toward the prop of sand. The American Surgical Association, at its last annual meeting, in May, 1900, displayed the impulses of mediæval enthusiasm on subjects they did not understand or that seemed heretical. They resolved, by unanimous vote, that the "skiagraph is inadmissible as evidence in court because, being a picture of a shadow and not of the object, it is inaccurate and unreliable." Strange dark-age reasoning! While Galileo was teaching that the earth was round the conventions of the learned were casting nets and they said his light must be put out. While Savanarola was showing the iniquities of priestly practices the learned said his light must be extinguished, for we are good and know the way. While Jenner was advocating the certitudes of vaccination the conventions of the learned rose in unanimous condemnation. When McDowell announced a way for adding years and comfort to the life of woman Meggs, voicing the profession, said: "Death resulting from ovariotomy should be followed with an indictment for manslaughter." While the x-rays are being used without inaccuracies and with perfect reliability the learned associations representing the surgical branch of American practice cry the cry of darkest days. It seems strange that no one in all this convention knew or, if he did know, dared to express the fact that throughout this entire land the courts have admitted skiagraphy as evidence. More than this: in some instances the picture has been ordered shown to the jury. These decisions have been made favorable to the x-rays by all grades of courts, circuit, district and United States courts.

This divergence was prompted by the quotation in Dr. Grant's article of the action of the American Surgical Association.

We are very glad to know that Dr. Grant is using the x-rays. If he will use the well-known devices for correcting human inaccuracies, the x-ray picture he will get in the future will be correct and reliable. There is another point that should be considered. Every x-ray picture should show the thing sought in unmistakable clearness. If it fails in this it is a poor thing to show. This kind of a picture is a powerful argument in favor of the so-called inaccuracies. Writers upon this subject do well to use just such evidence. Dr. Grant's skiagraphs have this taint. It would be immeasurably better to write the article without the picture. But one thing more for them who desire to do good work. The Doctor says that he had a case of fracture of the thigh that had no more than three-fourths of an inch shortening. The father of the child saw the skiagraph and exclaimed that it was a "bad jumbled up leg." He saw the callus and took that for overlapping of the fragments. Now the Doctor wants to call particular attention to this apparent overlapping. He says: "The distinction is highly important. Imagine the influence of such a picture on patient or jury." Did it ever occur to the doctor what influence dark extravasation of blood beneath the eye might have on patient and jury? It is quite probable that there would be no contention over an explanation of the apparent injury in either case. Do not let apparent bugbears haunt us.

Now is the best time for subscribing for The American X-Ray Journal—$3.00 a year.

THE X-RAY IN QUACKERY.

The Journal of the American Medical Association contained an editorial upon the above subject. Surprise was expressed that quacks had not long since taken up this implement, but submitted an explanation that it was due to the requirement of some knowledge of electricity before the x-rays could be used. The article implies ignorance of science and letters on the part of quacks. This thought is in accord with the old definition of the word. Medical laws are quite severe throughout the States and yet quackery is, if possible, more aggressive now than formerly. If one acquainted with the subject and correct uses of the x-rays will carefully look over the literature of the subject, they will see the inroads made by this class in the field of this most important branch of our profession. It is not always the one who employs the columns of the lay press to picture his assumed skill that injures the fair name of doctors. This is a class by themselves. They allure a class that seek them, and if not found do not employ anyone. They are not always ignorant either, but pervert righteous calling into scheming. They have always existed, and they are here to stay. Medical laws have improved their standing, because besides flaunting the sheepskin they gild the frame about their State Board license. They are made in law and equity our equal. It seems now that some tendency to draw nearer together actuates the entire practice. If the action of "professional" writers is considered this is true. Taking the definition of the word as is assumed by the editorial mentioned ignorance has prompted more articles upon the x-rays than quacks, or, in other words, ignorance has even dared to write. See the articles by learned professional men upon the inaccuracies of the x-rays. It is absolutely known that there is no such thing as inaccuracies of the x-rays. These inaccuracies are wholly the errors of the operator. Do we have inaccuracies of the law of gravitation? Of reflection? Of magnetism? Of radial energy? When these fixed laws of nature are misunderstood then the would-be-wise sage of maturity leaps into the medical press, with the credit of his former bearing, and affects the professor's part. They cut for bullets, and failing to find them under the triangles, wires and fluoroscope, see a new vista and proudly assume the role of the world's teacher and tell how careful we should be in depending upon what we see. What an inglorious assumption. See the x-ray pictures so frequently used in journals. They tell nothing. Many are perfectly blank, black blotches, without detail and without evidence of the description. No other kind of a picture purporting to show something would be used by an editor. Why, then, these? They should be equally delineative as other pictures are.

These efforts to do something or say something upon a subject wholly at variance with the education of the writer is quackery. A writer of a book wants a subject written by some well-known man in the profession. He assumes the new science. He has absorbed the literature and written upon all subjects of medicine and surgery. The x-ray is new and has the sanction of the wisest men and is revolutionizing methods of diagnosis. It is an honor to go into an accredited work as author of this subject. The task is undertaken and how shamefully it is handled. These books are not written for novel reading but for land-marks for the practitioner. He who assumes the role of such a writer should know the subject whereof he writes. Soever wise he may be in all other domains, if ignorant in this and writes as a teacher he is a quack. The medical profession should awaken to the realization of the responsibility the subject bears to us and question seriously every writer who can tell of the faults of the x-rays. Let him answer to his own faults first. Look to himself and see if it is not the self at fault and not the x-rays. Then we will begin to standardize uses of the rays and raying will become as accurate in the hands of the profession as they are free from inaccuracies. The consummation of this knowledge by us leaves those who would imfringe upon its moral application the task of study and thought and practice, all of which when acquired is a more profitable practice than quackery. Thought in science is honest and honest thought leads on to honest practice.

MISSISSIPPI VALLEY MEDICAL ASSOCIATION.

It is announced that the dates of the next meeting of the Mississippi Valley Medical Association have been changed from the 10th, 11th and 12th, of September to the 12th, 13th, and 14th of September. This change has been made necessary because the dates first selected conflicted with another large Association meeting at the same place.

The meeting is to be held at the Hotel Victory, Put-in-Bay Island, Lake Erie, O., and the low rate of one cent a mile for the round trip will be in effect for the meeting. Tickets will be on sale as late as September 12, good returning without extension until September 15.

Those desiring to read papers should notify the Secretary, H. E. Tuley, 111 W. Kentucky St., Louisville, Ky., at an early date.

Dr. John A. Wyeth, of New York City, was elected President of the American Medical Association at St. Paul. The Association, we are glad to note, gave much attention to the x-rays.

SEEK AND YE SHALL FIND.

Dr. J. William White, in the *Post Graduate* for January, 1901, has made "conclusions" and enumerated seven aspects into which, according to his opinion, the whole realm of x-ray uses fall. However, it is possible that Dr. White summarized from the "Report of the Committee of the American Surgical Association on the Medico-Legal Relation of the X-Rays." That so cogent and precise conclusions should have been agreed upon in this highly scholastic, dignified body is not surprising. Of course, if this body of thinking men had used the x-rays more and studied the technique with apparatus and accessories one would have seen divergence in these "conclusions" of Dr. White's. We have the evidence from men using the x rays, that are themselves eminent in the surgical field, that there was "lukewarmness of the American Surgical Association at that meeting upon this most important subject." Yet, we are confronted with conclusions. First, the routine employment of the x-ray in cases of fracture is not at present [but when, Ed.?] of sufficient definite advantage to justify the teaching that it should be used in every case." What could be the reason for calling attention to "every case." We do not have our attention called to the "definite advantage to justify" the use of anæsthetics in "every case." This sentence has more of the twang of verbosity than correct teaching, or something of the suggestion of confusion.

The first sentence of conclusion 2, has the same odor. In reference to the skull, the writer says the results have not been "thoroughly satisfactory." I have never seen anything from the surgeon wherein he alleged "thoroughly satisfactory" results from the use of the trephine. Have we a bugbear for x-ray, but none for the other implements of the surgeon's armory?

Conclusion 3, says: "The appearance of deformity may be produced in any natural bone." This conclusion, if I understand the writer, is absolutely impossible. Yet, it is certain that all radiographs are deformed pictures. This paradox has an explanation: In the former case, take a shaft, for instance, it is impossible to produce the appearance of a fracture. This statement of deceptive fractures has been often written. A mere tyro would not look to the plate for waves, to backing up rays, causing shadowing from something beneath the plate or something over the bone. When the deformity exists, it may be by intention improved or distorted, but in no way in normally radiographing can a solution of continuity be made that is not detected. But, "expert surgical interpretation" is not free from error. Then why should the x-ray bugbear overcaution the surgeon if it is "frequently misleading."

These "conclusions" go on until seven have been exhausted. They are all of the character of the first and should be read with great latitude. In reference to the location of foreign bodies the "conclusion" is very misleading. If the foreign body can be seen it can be located mathematically. If the surgeons of the American Surgical Association would study visual uses of the fluorometer with the same ardor they study rounding sentences, I am sure in every such case there would be no error in localization of foreign bodies.

In reference to conclusion 7, wherein the "strictly legal standpoint" is considered, I am glad to say that in no instance in any court in any state, has the x-ray picture been denied its proper place if the physician was prepared to prove the accuracy of his radiograph. No one can safely go into court with a radiograph and allege its correctness unless he has used means to correct divergence by position and normal divergence of the x-rays in the cited instance. If you have done this and are familiar with your subject, you can use familiar phrases and terms understandingly to the judge and jury, which effectually removes all objections.

If these frightened advocates of scholastic certitudes upon the inaccuracies of the x-rays, would read and practice the teachings found in THE AMERICAN X-RAY JOURNAL, their efforts would not be in vain. The lasting glory of our profession, medicine and surgery, depends upon those who teach correctness of diagnosis and not upon those who teach inaccuracies of personal work without a remedy. Seek and ye shall find.

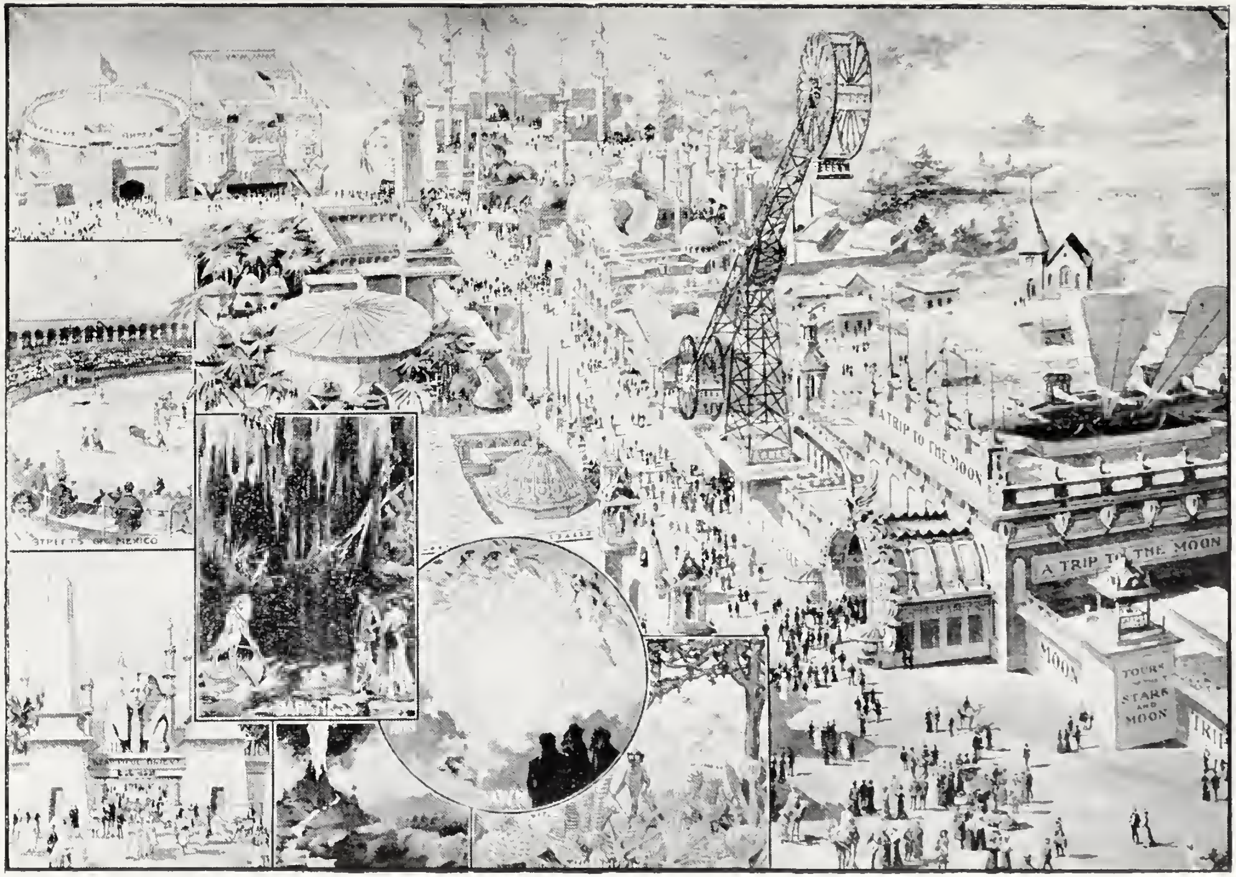
TRIGONOMETRY IN X-RAY WORK.

Dr. Egelston, of Kansas City, reports the findings of trigonometry essential to x-ray localization. This is a good thing, but applies essentially to those cases where visual uses of the fluoroscope are impossible. Where photographic methods are necessary the U S. Surgeon General has adopted the method of Mackenzie Davidson, properly called localization by multiple observation. A more simple method and recently put in practice, is that of Prof. M. L. Pence, of the State College of Kentucky, reported in the AMERICAN X RAY JOURNAL for May. This method meets every want, but requires some study of the subject or a previous knowledge of higher mathemathics. In all cases where the object can be seen with the fluoroscope the fluorometer is incomparably more practicable than any other.

Dr. Walter Byron Scott has a lonesome time of it, as he is the posessor of the only static machine in his part of North Dakota. The citizens of Crystal, the home of the doctor, should feel proud of a physician in their midst that takes advanced steps for the relief of suffering humanity.

FORGERIES IN ART PROVED BY X-RAYS.

Several eminent authorities in the art have been interviewed upon the genuineness of pictures and the part x-ray has in detecting forgeries. It is a well known fact many paintings are sold nowadays, upon which very clever signatures are made of some one of the old masters of art. An old painting is valuable in a monetary sense in proportion to the fame of the artist who did the work. The subject has awakened a good deal of interest lately in Berlin, not alone for the purpose of detecting fraud of the signature, but to bring out invisible or lost signatures. Herr Paulus, manager of the Schuite Art Gallery, said: "It also depends upon how the signature was executed. If in gold letters the x-rays would not go through them. Many painters simply scratch their names on a picture. If gold monograms, such as that of Durer, have been covered by varnish, which deepens in color by age, they can generally be read by turning on a bright light." Professor Doepper said: "Photographs render great service in detecting forgeries because the camera sees better than the human eyes, greater service can be rendered by the x-rays" Professor Hauser, picture restorer at the Royal Museum, said: "If a picture has been so well retouched that it can be seen by the naked eye, it can be proved by means of x-rays, for the retouching and added colors as a rule, contain other material or other combinations, and these are variously affected by x-rays. I have seen the monogram of Durer brought to light by x-rays, but I nevertheless regard the picture as a clever forgery." Herr Hugo Schmidt expressed himself in the same line. Herr Schulz Haucke, who was one of the first to apply x-rays to testing precious stones, said: "If the picture is on silk, papier mache or wood x-rays are of value, but not when the picture is on metal."



THE MIDWAY, PAN AMERICAN EXPOSITION. Bird's Eye.

BULLET IN HIP JOINT.

We reproduce the written words of Dr. C. D. Harrington upon the above subject, which appeared in the *Northwestern Lancet*, because it so fairly represents the uncertainty of practice which finds exactness only when the x-ray is properly used.

The bullet was a 38 calibre and fired at a distance of ten feet. The doctor says:

"The bullet entered on the anterior side directly over the femur, at about the junction of the middle and lower thirds. The leg was slightly advanced and the body erect. The shooting occurred Oct. 29, 1898, at 10 p. m. At 11 p. m., the bullet was probed for by a local doctor, but it was not located. The next morning Oct. 30, the patient walked three blocks without aid to the doctor's office, and an attempt was again made to locate the bullet by probing, which was unsuccessful. The patient then went to bed. The next day he came to Minneapolis, a distance of five hundred miles. November 1, he went to St. Barnabas Hospital. He was kept in bed for two weeks, then an attempt was made to walk, but he was unable to do so. There was no pain until the morning after he was shot, when it became severe, radiating from the knee to the hip joint. It became more severe while in the hospital. The leg was kept in extension three weeks. The bullet was supposed to be in the pelvis. On November 25, an x-ray examination was made, but the bullet was not located. The patient was kept in bed until February, 1899. At this time he had changed doctors and they had decided to operate, which they did at this date.

"An incision was made over the point of the entrance of the bullet. It was found that the anterior cervical nerve had been severed. This was sutured with fine silk, but the bullet was not located. The wound was closed, union taking place in a few days. In a short time the galvanic current was applied. At the end of April the patient was able to walk with the aid of crutches or a cane. Up to this time he had been unable to use his leg or to put on his shoes without help. He had pain more or less severe until June 12, 1899, when an abcess which had been forming, broke through the incision which had been made for suturing the nerve. More or less pus kept discharging from the wound until September, when he was brought to my office, being able to walk by using a cane.

"Upon examination, not much motion could be made in the joint; foot slightly rotated inward; flexion, adduction and internal rotation caused some pain, which was not felt so much on abduction and external rotation.

"From the examination I concluded the bullet was in the hip joint. An x-ray examination was made; an 8x10 inch plate was placed under the hip joint, with patient in recumbent position; the Crookes tube was placed directly over the brim of the pelvis at about eight inches distance from the body; fifteen minutes' exposure. Upon developing the plate, the bullet was located in the hip joint, lying in the acetabulum in the anterior and lower aspect. An operation to remove the bullet was decided upon.

"On November 2, a regular Parker's incision for the excision of the hip joint was made, starting about one-half inch below and external to the anterior superior spine of the ilium downward and slightly inward for two or three inches, going between the tensor vaginal femoris externally, and the sartorious internally, and deeper between the gluteous minimus externally, and the rectus internally. Owing to his being a very muscular man this was found to be a difficult task. An opening was made where the old abscess had pointed, and with a small flexible probe, the sinus was followed down to the joint, by careful dissection, with the probe as a guide, when within a few inches of the joint, by manipulating the probe, a metallic click could be felt, locating the bullet. The opening in the capsule was enlarged to admit a medium-sized forceps, and the bullet was loosened from its bed by a dull curette, and extracted by forceps. The bullet had been slightly battered on the end. Considerable damage had been done to the head of the femur, so that all debris was scraped out and the wound packed with iodoform gauze as a drain. The patient was able to leave his bed at the end of two weeks, and was soon able to walk. In a letter dated April 2, 1900, the patient reports that after leaving the hospital he had considerable pain about the hip joint, radiating at times toward the knee, but he was able to walk without the aid of a cane, and the motion in the joint was gradually increasing.

"P. S.—Since this article was published, the patient called at my office and reported that he had been working all summer as a bridge carpenter, pain had not entirely left, but he had a good and useful joint."

BECQUEREL RAYS.

Reports are still being made before the French Academy of science of "radiant metals." Pitchblende is closely allied to titanium, but it is from the former that the new metal is obtained. The two other metals, polium and radium have radiating power far more intense than uranium.

The Librarian of Congress, Washington, D. C., greatly desires to have Vol. 6, No. 1, of the American X-Ray Journal. If any of our readers having this number can spare it we will appreciate their kindness in sending one to us or to the Librarian of Congress, Washington, D. C.

ROENTGEN SOCIETY OF THE UNITED STATES.

ANNOUNCEMENT OF COMMITTEE ON ARRANGEMENTS.

The Committee on Arrangements for the next meeting of the Roentgen Society of America have secured, through the courtesy of the Dean and Faculty of the University of Buffalo, the use of as much of its building as we may require. The location is central, the room ample and on the ground floor. The date of the meetings will be Sept. 10 and 11 at the University of Buffalo, Buffalo, N. Y.

The following rules and regulations in regard to exhibits have been adopted by the committee: Applications for space should be sent as early as possible to R. C. Adams, Secretary, drawer No. 963, Buffalo, N. Y., with particulars as to character of exhibit and space needed.

Exhibits may be consigned to Louis Staffeldt, care University of Buffalo, and all express and freight charges must be pre-paid. Owners of goods sent by freight who wish them transferred to place of meeting on arrival, must notify the secretary and send him the pre-paid bills of lading. The cartage will be at expense of owners.

Exhibits are wholly at risk of owners, and should be unpacked and installed by them not later than Sept. 7.

Alternating current 104 volts, single phase, 60 cycles, and direct current 110 volts, will be available, also dark room for photographic purposes. All exhibits must be removed by Sept. 13.

Edgar B. Stevens, Chairman.
Roger Cook Adams, Sec., Drawer 693.
Dr. James W. Putnam,
Dr. Elmer E. Starr,
Dr. Rennick R. Ross,
Committee.

ROENTGEN SOCIETY.

The following notice, made by Professor Monell, Chairman of Committee on Standards, appeals to all persons whomsoever that have any knowledge on this subject; and commends itself especially to medical men having interest in the attainment of more knowledge. Write to Dr. Monell and give expression on one or more of these subjects.

COMMITTEE ON STANDARDS

DEAR SIR:

To promote uniformity in results and to secure accuracy and give legal value to the evidence of x-rays, it is necessary to standardize methods of doing the work. To this common benefit all x-ray experts are asked to contribute for the general good of the cause. You are therefore invited to write me your best suggestions on such of the following points as you can offer advice upon:

A standard uniform nomenclature for the principal terms required.

A standard form of record-blank for briefly filing reports and indicating all essential details of the exposure.

Standard of efficiency for tubes.

Qualities which a standard x-ray photographic plate should possess.

Qualities which a standard x-ray fluoroscope screen should possess.

Standard handle for all x-ray tubes so they will fit a standard tube-holder.

Standard tube-holder to fit uniform standard tube-handle—adjustable, rigid, holding tube without vibration—and convenient for general use.

Standard position of tube for correct shadow.

Standard distance of anode from plate for standard x-ray exposures.

Standard exposure times for chief parts of the body with a standard radiance.

Standard measure of different degrees of x-radiance.

Standard "skiameter."

Standard x-ray examination table, adjustable for all parts of the body.

Standard method of posturing each part of the body for a standard picture.

Standard means of fixing parts immovably during a standard exposure.

Standard complete definition of what a "standard exposure" should be. (Of medico-legal value.)

Standard land-marks to be pictured in the negative as inherent proof that a standard exposure was made—(a medico-legal necessity).

Standard method of localization for both "skiagraphy" and "fluoroscopy," which shall be the most practical, quick and uncomplicated.

Standard technique for picturing correct relation of bones and joints.

Standard technique for picturing details of any kind sought.

Standard technique for picturing contrast for diagnosis of soft parts.

Standard technique for picturing the different calculi, vesical, renal and gall-stones.

Standard technique for x-ray dental diagnosis.

Standard technique for x-ray eye work.

Standard technique for x-ray heart and lung diagnosis.

Standard treatment of plates to develop uniform results.

A standard leaflet of brief directions which the physician who does not do his own developing can send with his plates to any fair photographer as a ready guide to proper treatment of an x-ray negative to secure the picture.

Standard technique for therapeutic administration of x-rays with proper precautions.

You are invited to supply any omitted detail which you believe should be standardized. Will be pleased also to have you select one or more features of the above list in which you have had special experience and make a careful report upon what you regard as the proper standard to officially adopt. A reply is desired in about two weeks. In offering suggestions about standard working methods, postures, special devices, apparatus, etc., it is desirable that you send explanatory camera-photographs illustrating the details for comparison. Thanking you for your professional co-operation in behalf of the committee, I remain,

Fraternally yours,

S. H. MONELL, M. D.,
Chairman of Committee on Standards.
47 West Twenty-seventh street, New York City.

Dr. Carl Beck, of New York City, exhibited a class of skiagraphs before the American Medical Association, at St. Paul, this month, together with an intelligent description of their diagnostic worth. In speaking of this, it has become a by-word to say "the x-ray workers were in it this time." We are told that those who have heretofore branded their own brows with the clause "inaccuracies of the x-rays" are now tumbling over each other for an escape from the stain.

ROENTGEN SOCIETY OF THE UNITED STATES.

Committee on Scientific Research.

The above committee consists of Mr. H. Westburry, Harrison, N. J.; Dr. John B. Murphy, 3505 Michigan avenue, Chicago, Ill.; Dr. A. Clifford Mercer, Syracuse, N. Y.; Mr. Elihu Thompson, Lynn, Mass.; Mr. Nikola Tesla, 46-48 East Houston st., New York City. Members of the committee and all other persons interested in this subject are earnestly requested to correspond with Mr. H. Westburry and co-operate with him in this work. The importance of a full report from this committee to the Roentgen Society in Buffalo September 10 and 11 must be fully appreciated. Since no member of this committee has refused to serve, and since it is known that every member has more than local prominence in scientific research the professional world are expecting much useful matter. While so much is expected from the committee, we cannot refrain from urging others to write to them and especially to Mr. Westburry, giving additional suggestions and information from various standpoints of individual thinking.

DETECTING AND EXCLUDING RENAL AND URETHRAL CALCULI.

Leonard has examined 136 cases suspected of having renal or urethral calculi. Of this number 19 cases had urethral and 17 cases renal calculus. From this he concludes (1) that both the negative and positive diagnoses by the Roentgen method are accurate and valuable; (2) that urethral calculus is much more common than has been supposed, constituting about 50 per cent of all cases of calculus; (3) that it is impossible to arrive at as accurate a diagnosis of calculus by other methods; (4) that this method is comprehensive, and aids operative intervention by localizing all calculi and excluding calculi from the other kidney; (5) that non-operative treatment, without a negative diagnosis by this method, is irrational and dangerous in cases that are at all suspicious; (6) that this method is precise, because its results are mechanically produced, but that accuracy in its employment and care in reading the results are necessary to the avoidance of error; (7) that the data obtained by this method make non-operative conservative treatment rational in cases of small calculi low down in the ureter, which can be expected to pass; (8) that the negative diagnosis does not preclude exploratory nephrotomy, but does make unnecessary the actual incision into the kidney in search of calculi; (9) that dilatation of the ureter with bougies, as has been practiced in the female, may be employed in the male by utilizing a suprapubic cystotomy wound to guide the instruments from the urethra into the ureters.

GOOD X-RAY PICTURES.

The *Annals of Surgery* for May and the *Inter-State Medical Journal* for the same month contain reproductions of some of the skillful x-ray pictures made by Dr. J. Rudis-Jicinsky of Cedar Rapids, Ia. It is a relief to see these excellent radiographs printed in these high-grade journals. If nothing less descriptive than these were ever allowed in medical journals it would mark an era of journalistic evolution and aid materially interest in x-ray work. Poor pictures or those that tell nothing to the untutored are humiliating, disgusting and retrograding, while properly made pictures teach and encourage this greatest diagnostic means known to the profession of medicine.

X-RAY AS AN ANALGESIC.

Dr. Stembo, of Wilna, Germany, reports a number of cases of satisfactory action of the x-rays in neuralgia. He exposed the parts to the rays from five to ten minutes at a time and the sittings numbered about ten.

"RUDOLF VIRCHOW FUND."

To the American Medical Profession:

On October 13, 1901, Rudolf Virchow will be eighty years old. When he completed his seventieth year a fund was started in his honor to enable the great master to facilitate scientific research by establishing scholarships and by encouraging special medical and biological studies. Contributions to that "Rudolf Virchow Fund" were furnished by those in all countries interested in progressive medicine as an homage to the man whose name is always certain to arouse admiration and enthusiasm.

In Berlin a large committee, containing among others the names of A. Bastian, V. Coler, A. Entenburg, B. Fraenkel, O. Israel, Fr. Koenig, C. Posner and W. Waldeyer, has been formed to call for contributions, which are to be added to the original "Rudolf Virchow Fund," so as to increase its efficiency. The committee expresses the opinion that in no better way, and in none more agreeable to the great leader of modern medicine, can his eightieth birthday be celebrated, and ask for the sympathy and co-operation of all those engaged in the study and practice of scientific medicine all over the globe.

The undersigned have formed a sub-committee for the purpose of making the American profession acquainted with the intentions of the Berlin committee, and urge their colleagues to participate in honoring the very man who has done more, these fifty years, than any other to make medicine a science and international.

Subscriptions should be sent to their secretary, who will receipt therefor

Charles A. L. Reed,
President of the American Medical Association.
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